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A FEW REMARKS ON SUCTION PLATES, AIR CHAMBERS, AND ARTIFICIAL RUGÆ.*

By DAVID HEPBURN, L.D.S.

GENTLEMEN,—When invited by our President to open a discussion on some subject connected more particularly with Dental Mechanics, I elected to address to you a few general remarks on the subject of suction plates, air chambers, and artificial rugæ. It is not my intention to attack in any exhaustive manner the vast range of matter which may be comprised under this heading, but rather to throw out a few ideas which may form a basis for your discussion, and be a means of bringing to light the opinions of members of this Society on subjects of daily interest to all engaged in the practice of dentistry.

With regard to the natural means by which so-called suction plates are held in the mouth theorists may differ. I think, therefore, it may be interesting to dwell for a few moments on those forces which participate in the retention of such plates.

In the first glance at the subject, the mind naturally reverts to that simple contrivance called “a sucker,” by means of which stones and other weights may be raised from the ground, and one is apt to think that the simple phenomena attendant upon the action of this appliance sufficiently explained the means by which artificial dentures, when unaided by clasps, valves, or springs, are held *in situ*, but such is not the case. A more searching inquiry reveals the fact that here we have but a partial illustration of what actually is taking place.

Let us take the force of “adhesion,” and see to what extent it participates.

Adhesion denotes the attraction exerted between particles of two different bodies when placed in contact with one

* A Paper read before the Odontological Society of Great Britain.

another, in contradistinction to "cohesion," which denotes the attraction which the various molecules of the same substance have for one another.

I need not refer to the various kinds of adhesion, but quote for our purpose *two*, namely : the adhesion of solids to solids, and fluids to solids.

Now if we take two pieces of smooth glass and press them together we find that they adhere firmly. This is not entirely due to atmospheric pressure, for if the pieces of glass be suspended in the vacuum of an air-pump, it will be found that the union is not disestablished, showing that some other force has been at work in holding them together. This force is the force of "adhesion."

The adhesion of solids to liquids may be exemplified in like manner by lowering a finely balanced piece of glass on to the surface of a liquid. When it is raised again, globules of the liquid will be found clinging to its under-surface, and according to the nature of the liquid so will the adhesive force be evidenced to a greater or less degree.

Now although this is an independent force it must be borne in mind that exclusion of air is necessary for its operation, a fact of practical importance in its application to artificial dentures.

Thus, then, we have the force of adhesion as an important factor in the retention of plates, the adhesion between the artificial base and the mucous membrane being largely aided by the saliva, the viscosity of which renders it a suitable and helpful medium. It is also interesting to note the influence of another force, namely, "capillary attraction," which may be defined for our purpose as "the tendency which a fluid has to find its way between closely fitting surfaces." And it is easy to imagine how, when an artificial denture is held steadily in the mouth for a time, either by pressure of the hand or antagonism of the opposing teeth, the saliva influenced by this force would prove a valuable agent excluding air and establishing the desired adhesion.

Let us now briefly consider the laws of "atmospheric pressure" in relation to our present subject.

The atmosphere, possessing weight, and capable as it is of exerting a pressure of about 15 lbs. on the square inch, presses upon substances at the earth's surface, but being a fluid, and following the laws of fluids, it exerts its pressure equally in all directions. Consequently its influence is not appreciated. If,

however, the normal conditions be altered, the force of this pressure may be made evident, and no better example of this can be given than by quoting the familiar instance of the "Magdeburgh Hemispheres'" experiment. When these two hollow brass cups are adjusted together, and the contained air exhausted, it will be found that tremendous force is necessary to pull them asunder, in consequence of the absence of pressure from within affording full play to the pressure of the atmosphere from without.

Now this is very much the condition we endeavour to establish when we apply a plate with an air-chamber, but we shall presently see how our endeavours to enlist atmospheric pressure as a retaining force are frustrated by the nature of the oral structures, with which we have to deal, when influenced by natural laws.

In order to make my meaning clear, let me refer to one other quality possessed by the atmosphere, namely, its elasticity. The atmosphere is capable of expansion and compression to a marked degree. The withered apple in the bell of the air-pump resuming its normal proportions by expansion of its contained air, as the air in the bell is exhausted, exemplifies this, while on the other hand compression of air may be illustrated by the conditions occurring in the descent of the diving-bell. Here pressure of water, to a certain extent condensing the atmosphere in the bell, gives rise to those disagreeable symptoms which any one who has made a descent must have experienced, and the elasticity of the atmosphere is further made manifest by the sudden rush of air in the shape of bubbles as the bell nears the surface and the pressure of water is removed. Thus all through there is a tendency towards the establishment of equilibrium, and whenever this condition is interfered with, certain indicative phenomena arise.

Take, for example, the ordinary operation of cupping. The air being exhausted in the cup, the soft tissues immediately rise to fill the space forced on by the unopposed pressure of the air in the body acting by its inherent elasticity, and much the same thing occurs when we apply the plate, with its air-chamber, to the mucous membrane of the mouth. It shortly becomes completely filled with tissues, and when this happens as an *air*-chamber it ceases to act.

It therefore becomes an interesting question how far chambers are useful as a means of retaining plates by atmospheric pressure.

When a plate with an air-chamber is applied to the mouth, two phenomena are evidenced. First its apparent adhesion, and secondly the obtrusion of the soft tissues of the palate into the chamber. If the tissues be soft and moveable, the occlusion of the cavity will take place with great rapidity. If they be hard and unyielding, it will take place more slowly and to a less degree ; but in any case there is an attempt of nature to do away with the vacuum which is caused by the sudden application of the plate with its air-chamber to the surface of the mucous membrane.

Now that air pressure can act as a retaining force in such cases it is necessary that a vacuum should exist, and considering the fact that under the most favourable circumstances only a partial vacuum can be created, I am inclined to think that air-chambers, as such, are of comparatively little service.

How far their action can be increased by the use of suction valves, such as those invented by Brownlie and Leman, is a matter well worthy the consideration of members of this Society, and I trust gentlemen who have tested the efficiency of these valves in practice will give us the benefits of their experience.

With regard to Hall's suction disc, which is typical of the original "sucker" in its action, I can quote at least one case where its employment, in spite of its perishable nature, and its effect on the tissues, has enabled a patient to retain an upper palate under, apparently, the most hopeless conditions.

But turning to another aspect of "chambers," let me acknowledge their great use and importance where employed as a means of equalising pressure—in such a case, for instance, as that of an edentulous upper jaw where the remains of the alveolar ridge is covered with soft yielding spongy mucous membrane, while the dome of the palate remains hard and resisting. In such a case I believe a chamber will prove of the greatest service.

Having touched lightly the fringe of what might be said on these interesting topics, I will conclude by saying a few words about "artificial rugæ," or "corrugated strengtheners," in association with suction plates ; and with your permission, Mr. President, I will explain these models and specimens which I have brought with me, and which show clearly the method of preparing the strengtheners and the simplest way of modelling the rugæ. This must be done by hand to suit individual cases.

(Explanation of Specimens.)

The advantages offered by these gold strengtheners are many. The rugæ are congenial to the tongue, and the use of the strengthener, besides imparting an artistic appearance to the piece, allows the vulcanite to be cut away so as to afford more tongue room. The strengthener, when corrugated, gains much additional strength, especially if the arches be judiciously distributed, a piece of Ash's No. 4 gold plate being found of ample thickness when well corrugated to resist without fracture the greatest masticating force. Further, with strengtheners so arranged, chambers, if necessary, can be conveniently cut out after the piece is made, and in cases of close bite the teeth may be soldered to the strengthener. Examples of such cases I now beg to pass round for your inspection.

In conclusion, I feel that I ought to offer some apology for bringing so simple a matter before your notice; but I have found, in conversation with various professional friends, that the modifications of this ancient method of work which I employ in my own practice are not in very general use, and I shall be most happy to demonstrate them to any gentlemen to whom they may offer any points of novelty or interest.

ELECTRICAL PROGRESS AND DENTAL PRACTICE.*

By A. KIRBY, L.D.S.

It is a very easy matter to propose to oneself the preparation of a short paper, upon such a subject as the one I have had the temerity to venture upon, but various difficulties of a more or less formidable kind present themselves as soon as the task is taken seriously in hand. The first is to decide whether the matter shall be treated in a popular manner, or whether a considerable acquaintance with it shall be credited to those who may have the patience to hear, or read what has been written.

Several considerations, not the least of which may be the state of the writer's own knowledge, point rather to the

* A Paper read before the Odontological Society of Great Britain.

former course, and I will not apologise for adopting it, because few persons would look for very advanced treatment of such a wide subject in the time which is at our disposal.

We are accustomed to hearing that "electricity is the power of the future," but those who use the phrase do not attach any very definite meaning to it, and the idea which is suggested by it is not altogether a correct one, for electricity is not a source of power or energy in the same way that fuel, or wind, or a head of water may be considered so. Its real value consists in the ease with which it can be transmitted from place to place, and the facility with which it can be converted at will into mechanical motion, or employed for purposes of illumination, and for those uses its value can scarcely be over-estimated. Before, however, it can be employed for these or any other objects, it is necessary to obtain a supply by setting it at liberty from combination with some form of matter, or by changing some other form of energy into that which we know as electricity; it is in accomplishing the latter purpose that the most important improvements have been made during the last three or four years.

In the earlier days of electrical science and practice, a current was produced only in the first method indicated, by means of galvanic batteries, and the attention of many workers is still directed to endeavouring to obtain a supply from such means, but hitherto it has not been found possible to carry any of them out on a very large scale. When seeking some two or three years ago for the best method of getting even the small supply necessary for operating dental motors, &c., I investigated most, if not all, of the known types of battery, including those on the most recent principles, and was greatly disappointed to find that all of them were the subjects of some drawback which unfitted them for the purpose: some were troublesome and dirty to charge and discharge, others required the removing of plates from the fluid when they were out of use, and many, if not all, were the subjects of rapid deterioration. The results of these experiments were confirmed in a very perfect manner by some which were made at the same time to test the utility of batteries for electric lighting, an account of which was published in the scientific periodicals after their termination.

The conclusion I arrived at was that storage cells offered the best means of supplying our requirements, and on differ-

ent occasions I have advocated their use ; at the present time, where obtainable, they are very frequently used.

Unfortunately I had no convenient means of getting storage cells charged, and as the Lèclanche battery in use showed some of the usual battery defects, in the course of time I made some further trials which included a "zinc carbon" pair in diluted sulphuric acid ; this answered so well that more cells on the same plan were tried, but for some undiscovered reason none of them gave the same good results, although many various samples of gas and artificial carbons were used.

One well-known battery, that of Smee, had not been tried up to this time on account of its low E.M.F., although it is spoken of by Spague as "one of the most valuable gifts ever made to electric science;" it was therefore thought deserving of attention, and one was set up and charged. At first it did not seem very promising, but as soon as the diluted acid had become quite cold it gave a very good current, and with it an electro-motor answered in every way satisfactorily. Here then appeared to be the solution of the difficulty of obtaining current for small motors by means not inferior to a storage battery. Certain small difficulties, however, still remained, such as the necessity for frequent amalgamation of the zincs, and the unpleasantness of handling the acid ; these, however, were all surmounted, and the battery has been in constant use for nearly two years, which has given a good opportunity of proving its advantages, and of these I am obliged to speak very highly. When once charged it remains in action for a very long time—weeks or months—according to the size of the cells and the amount of work they are called upon to do. The zincs, if properly prepared, will go for a year, or until worn out, without requiring re-amalgamation, and it is not necessary to remove them from the fluid when they are not at work. It requires less trouble to re-charge the whole battery than to clean and charge one cell of any ordinary double fluid battery. I have dwelt at considerable length upon this battery, because it is not improbable that with the storage cell it may prove to be our most suitable and useful source of power.

I need hardly tell you that the greater part, practically the whole, of the current which is used for electric lighting and for large motors is obtained from steam, or water power by means of dynamos, or machines which convert mechanical

into electric energy. Great part of the advances in electric practice during the last three or four years, of which we hear so much, consist in the improvement of these machines, but, paradoxical as it appears, these improvements are made up, according to Sir Frederick Bramwell, of "next to nothings," comprising such details as shortening the electro magnets which form the field, and making them considerably larger in diameter. The effect of these alterations is well shown in their application by Dr. Hopkinson to Edison's dynamos, the output of which is thereby practically doubled with the consumption of the same amount of H.P.

The improvements just named have special reference to machines which produce a *continuous* current, or a current always in one direction ; but, unfortunately, it is by no means a settled point whether a continuous or an intermittent current is the most advantageous, as witness the fierce war which is being waged at the present moment between the advocates of the rival plans, each of whom claim especial advantages for their own methods. There is yet another most important matter, indeed a fundamental one, which is not yet settled, and that is the best way of distributing the one or other kind of current when it has been obtained. This has so far been a great obstacle to the extended use of electricity in England, but there are other reasons which it may be interesting to look at, although they do not strictly belong to my subject ; perhaps the most important of these is the abundance of coal, and consequently low price of gas, in England. Electric light cannot compete with gas if the latter is produced much below 5s. per 1000 feet, but it is cheaper than gas when, as in some parts of America, the price approaches to 10s. per 1000 feet.

Another reason for the more extended use of electricity in America as compared with our own country is that our energetic cousins do not wait for a thing to be theoretically perfect before they put it into actual practice, whilst we are slower, and like at all events to *think* that we have arrived at something nearly approaching to perfection before we receive any novelty into daily use.

Having glanced at the different sources of supply, they must be dismissed with a very few words of comparison.

Concerning primary batteries enough has been said. Of storage cells it need only be added that they are daily coming

into more extended use ; some very large buildings are entirely supplied by their agency, and they are extensively employed for propelling trams and railway cars, and have for those and other purposes the advantage that each car, or train, or motor is independent of any outside connections. Large batteries of them are also used in connection with dynamo as reserves for power or current in case of a breakdown in the generating machinery, and under these circumstances do away with the necessity for a duplicate set of apparatus which would otherwise be necessary.

Of course storage cells require the use of a dynamo to charge them ; there is a certain small amount of loss in the process, and some care is necessary to prevent their being too much exhausted.

The next plan to be mentioned consists in using a continuous current directly from the dynamo, which can only be used whilst that machine continues to be at work. As the Electric Lighting Act does not allow the current to be taken into a house at a pressure of above 110 volts, the extensive use of this kind of current calls for the employment of very large conducting wires, or rather copper sheets or bars, so that there is considerable difficulty in its distribution upon a very extensive scale.

Being the kind of current we require for the description of motors at present in use, it has of course been proposed and to some extent employed for those of the very small size we need for our work ; but, unfortunately for us, so high an electro-motive force is not the most suitable condition of current to be supplied to them, and it is for this reason that primary and storage batteries are desirable for us.

To overcome the difficulty due to the necessity for the large conductors which are required to carry a quantity of low tension continuous current, an entirely different method of supply is largely used both in America and in other places ; this consists in generating a current of very high potential which can be carried in large quantity through a very small conducting wire, and converting it into current of very much lower potential before it is carried into the houses where it has to be used. It is not very easy to "transform" continuous currents, the plan adopted is therefore to use a current of the alternating kind which is very easily changed from a higher to a lower potential.

In the case of some of the very large works which are now

being constructed, the original E.M.F. of the current is as high as 10,000 volts ; this is reduced at distributing stations to about 2,400 volts, and finally to 100 as it passes into the houses. There is, no doubt, very much to be said in favour of the plan, but its opponents state that its use is attended with very great loss and waste, and that the machinery is apt to become over-heated, and so destroyed. The original pressure is of course highly dangerous, but its advocates say that they have overcome all these difficulties, or that they are of little moment. On the other hand, there appears to be the possibility of serious objection on behalf of the Post Office authorities, who have it in their power to veto any plan which is likely to interfere with their telegraphic or telephonic arrangements.

As a source of motive power the alternate current does not possess much special interest for us, because it will not work the existing forms of motors. Two or three inventors, however, claim to have devised machines for using alternating currents which profess to have some advantages even over the continuous current motors already in use, but up to last week nothing has been actually seen of such an apparatus which would start without being started.

With respect to the transformation of continuous currents from a high to a low potential, there are, I believe, some methods in use, including what is known as the motor dynamo : these, like the others already named, occasion some loss of power.

To the public generally the most important use of electricity is for procuring light without injury to the air of the room in which it is employed, but past its obvious advantages with which we are familiar, it does not possess any special claim to notice except to mention in passing the new form of glow lamp lately introduced by Messrs. Swan and Edison ; it is composed of a number of coils of filament, and produces a very concentrated light suitable for use with a condensing lens for illuminating enlarged microscope images, and for other similar purposes.

As a source of power, or rather as a means of transmitting and utilising it, electric currents may be valuable to us in our workrooms, but its especial use to us consists in the great facility it gives us and the labour it saves us in our daily operations, by giving motion to our burring engines. In these

respects its value can only be appreciated by those who have employed it.

Up to a very recent time the principles on which electro-motors should be constructed were very imperfectly understood, and at the present time there are two schools of designers, the one holding that the best dynamo is at the same time the best possible motor, and the other taking the view that the improvement in motors has been very much retarded by the attempt to adhere too closely to the lines of the best dynamos. Amongst those who do not altogether take the former view are, I believe, Professors Ayrton and Perry, and Mr. Albion Snell, whose recently published paper on the subject is most valuable and suggestive. The works of Professor S. P. Thompson and of Mr. Kapp, on the electrical transmission of energy, are also amongst the best authorities on the subject.

Our motors, however, are on such a minute scale that it seems going beyond the mark to investigate the rules which are laid down for the construction of the vast engines now coming into use, and we are constantly told that the rules which apply to large motors do not apply with equal force to very small ones. There are certain principles, however, which must underlie all of them—for instance, a piece of iron of a certain sectional area should only have a certain number of turns of wire, or rather a certain number of “ampère turns” of current passing round it, because if you increase the current beyond the amount which is required to produce magnetic semi-saturation, a great part of the extra current is wasted. For this reason motors of too small size are very wasteful; and this is important if a battery is employed, because we want each charge to last as long as possible. In designing a motor a certain amount of practical knowledge is necessary, and according to Mr. Snell, if you know the power of a certain motor, a rule-of-three sum will help you to the details of the one you require.

It is now some four or five years since I began to look into the matter practically, and after some refreshing reading, and buying a not very satisfactory motor, to try what I could do for myself in the way of contriving and building one. Various considerations led to the selection of the type, which was that of a machine made by Jacobi, and used successfully to propel a boat on the Neva more than fifty years ago. My machine had governors to regulate the speed, and an automatic switch to cause it to start as soon as the point of the instrument which

it carried was brought nearly into contact with the spot upon which it is required to operate.

When put into actual use the power required was not quite sufficient, but after laying aside for some weeks, a modification of the poles increased it so much that in the absence of the governors, which had been removed in the interval and almost forgotten, it was found to be too impetuous and had to be restrained. After a difficulty about self-starting without dead points had been got over, it was taken into regular use, and has been employed almost continuously ever since its completion. Indeed it answered so well that it was proposed to have similar ones made for other operators who might wish to use them, but the difficulty of getting them made, and arranging for their distribution, caused the matter to be laid aside for the time. Although Professor S. P. Thompson, in the new edition of his *Dynamo Electric Machinery*, speaks of Jacobi's motor as in fact a very advanced type of dynamo, differing very little from one of Wilde's most successful forms, it is always spoken of as being inferior to some of the more recent types. All the persons who were consulted, and whose opinions were considered to have weight, thought that it was possible the modified Jacobi might prove to be the most suitable plan for small motors; it was, however, thought to be worth while for the sake of comparison to have some motors made on the most recent ring armature principle. The Pacinotti type was chosen, and the proportions decided upon were found to agree with some of the best large machines. I have brought one of them with me this evening, which can be seen at the close of the meeting.

A motor of the earlier type is here also, and a comparison of the two is not without interest. It will be seen that the ring motor is of larger size, but it has fewer turns of wire; it also takes rather more current and runs at a higher speed, but it does not develop so much power, and this is especially noticeable at lower speed. Both motors have the same arrangement for automatic starting and stopping, as well as centrifugal governors by which the speed is adjusted and regulated, and either of them can by a very simple method be stopped instantaneously when running at their highest speed.

From what has been said, it will be seen that the old principle possesses some very considerable advantages. The one shown has the drawback of being rather noisy in consequence of being enclosed within a brass protecting case, but that is not a neces-

sary part of the apparatus, and is easily altered. The battery used is one of those mentioned in the earlier part of the paper.

In reference to the supply of current to small motors, it will be seen from what has been said that for those already in use (and we cannot say much for those which may possibly be brought to perfection some day) it must be of the continuous kind, such as that from a primary or secondary battery, or from a continuous current dynamo ; and further, its intensity must bear some exact proportion to the winding used upon the motor, because the latter, if wound to use a current of high potential, would not work with a current of low E.M.F., and *vice versâ*. We must therefore, before starting decide which is best, and for small motors there is no doubt the E.M.F. must not be too high, so that the current of a house-to-house supply, which will be about 100 volts, will be less suitable than that from a primary or a storage battery, going say from eight to twelve volts. With a moderately high current a slight shock is sometimes felt, but motor supplied with a very high potential current can only be stopped with safety to the user after the current has been considerably reduced.

The value of electricity on the treatment of disease is perhaps rather outside the scope of my subject, and is a side of the question which is usually looked at with some suspicion, some of the apparatus which is popularly advertised failing to give the smallest indication of electric current. One is tempted, however, to allude to the treatment of fibroid growths with a moderately strong current which seems to be successful. The greatest interest, however, attaches to the apparent success which has attended the treatment of some cases of cancer. For this purpose the rather high E.M.F. of 105 volts has been employed, and a quantity of about 0.6 ampère. The potency of this is rather striking when we consider it represents rather more than one horse electrical power, and would be sufficient for the production of an electric light of about twenty candles power.

If the theory be that cancer cells possess a lower vitality than healthy cells, and that growth may be arrested by an agent which is harmless to the surrounding tissues, we can well understand that the means used are not out of proportion to the end desired.

DESCRIPTION OF APPARATUS.

Mr. Kirby, in demonstrating the features of the apparatus,

said that the battery was one of the old-fashioned Smee type slightly modified. Its advantage was that when once charged it would go for a long time. When the motor was not in use there was little or no waste, and it answered instantly when connection was made. The plates were raised from the fluid in a similar manner on the same principle that a window is hung in its frame by balancing weights. In order to facilitate charging he had had a special form of glass-measure made with an outer cup to it which caught any drops of acid which might trickle over the sides of the inner cup. He claimed that the whole of the cells might be charged in ten minutes. Each of the cells was made separately. It was preferable to attach the platinized silver plate to an ebonite board. Each plate weighed about a lb. $3\frac{1}{2}$ lbs. zinc were equal to one-horse power. With ordinary usage the battery would last for several months. The current was carried by leading wires to the motor—the size of the leading wire was important; it was impossible to have too large a one. With reference to the motor, his own feeling was about burring engines that they should work at a slow speed. His motor was made with an internal governor; scientifically that was not the best form for a governor, but the scientific way only admitted of one speed.

PROFESSIONAL ATMOSPHERE AND MORALS; OR PATENTS AND SECRETS VS. A LIBERAL PROFESSION.*

BY HORATIO C. MERIAM, D.M.D., Harvard University
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It is natural to those who see the broad right of way that the liberal professions have held through literature, science, and art, to ask the sources of that right, how acquired and maintained.

In a commencement address before the Dental and Medical Schools of Harvard, in Boston, in 1871, the Rev. Edward Everett Hale gave the difference between a body of

*A portion of a paper read before the Odontological Society of New York, and reported in the *Dental Cosmos*.

professional men and a body of craftsmen. He held that every diploma given in a liberal profession contained three pledges which those who received them bound themselves to maintain by accepting ; a pledge to learn for all ; a pledge to practise for all ; and a pledge to teach freely to all. These three,—to learn for all, to practise for all, and to teach for all,—uniting as they do past, present, and future, and implying freedom, are laid as a foundation, whereby we may test the claim of dentistry to be a liberal profession.

Dr. Hale has not given authority to them, but whether his opinion or that of others, they concern us as a statement of the law of a liberal profession, the observance of which prolongs and strengthens its life, and the neglect or abandonment of which would be followed by professional death. The obligation to learn and teach brings to the front the position of doctor, or *teacher*.

The doctor's position has always depended on his fidelity as a teacher. Your nostrum-vendor, or maker of proprietary articles or medicines, who will not teach the making of their formulas, is one who disgraces this position and has no right to the title. So, also, if a discoverer or inventor in a liberal profession patents the requirements of his profession, making them his exclusive property, and, in the language of the Patent Office, secures "the exclusive right to make, vend, and use" them, he violates the pledges of his diploma, and has lost his claim to belong to a liberal profession.

Mr. Ruskin asks, in one of his essays, why it is that the clergyman, the lawyer, the physician, the army or navy officer receive more honour or hold a higher position in the opinion of the world than does the merchant, in proportion to the time spent in acquiring the essential knowledge. And he answers it by saying that the world has wrongly accepted the merchant at his own estimate, that he works for money and may decide without loss of prestige always in favour of those transactions that pay him best ; whereas, in the professions, the world recognizes that each must often turn from that which pays best to that which is the most dangerous or least profitable. The lawyer may become a judge, and must refuse bribes or to sit in cases in which he has a personal interest, or take advantage of knowledge, in a pecuniary way, which has come to him while hearing cases. The clergyman who neglects the care of souls or to teach truth for more profitable work, or who preaches error or falsehood if it pay best ; the physician

who would not face contagion ; the army or navy officer who would not risk his life, or who would retire on the eve of battle, for the sake of money,—are all without honour.

Agassiz, in his will wrote himself "Louis Agassiz, Teacher," selecting this title in preference to all others. While conducting some experiments in his laboratory, he received an offer of a large sum from the West for a course of lectures on natural history. He replied, "I cannot afford to waste my time in making money." This reply, natural to him, aroused great wonder, and Agassiz wondered that they wondered. He knew that hundreds of men both in this country and in Europe would have given the same answer. To a business man, the fact that a scientist was too busy to make money was a revelation. This brought the fact before them, and gave science in America a position and stimulus that it feels to this day. From that time on, money flowed to Agassiz in a continuous stream, and he who afterwards said that he was never a quarter of a dollar ahead in his life and never expected to be, found himself in a position to call for money as often as he needed it for science, and it came. He made the title of teacher almost glorious, and left a name that has been to science in America a continual benediction.

"This wonderful creature," as an admirer describes him, called not only money but men to his aid. From the emperor of Brazil with his mountains, to the farmer and labourer, who would leave their work to dig for him a specimen, all helped. There was the personality of the man to be sure, added to science ; but the scientific test for a scientist was the same before and is the same to-day. *Fidelity to their obligations to teachers.*

The article by the Duke of Argyle called "The Great Lesson" is of interest as illustrating this, and the atmosphere and morals of science, the integrity of its teachers, and the obligations to truth which they acknowledge.

The voyage of the "Beagle" ended in 1836, during which Mr. Darwin made his observations, and framed his theories of the formation of the coral reefs and islands. More than thirty-five years after, the "Challenger" expedition, with Mr. John Murray as naturalist, was sent out. He "made observation and drew conclusions that called for a new explanation." (I quote from the duke's paper.) "This was communicated to the Royal Society of Edinburgh in 1880, and supported by such a weight of facts and such a close tex-

ture of reasoning that no serious reply has ever been attempted. At the same time the reluctance to admit such an error in the great idol of the scientific world, the necessity of suddenly disbelieving all that had been believed and repeated in every form for upwards of forty years, of cancelling what had been taught the young for more than a whole generation, had led to a slow and sulky acquiescence rather than to that joy which every true votary of science ought to feel in the discovery of a new truth, and not less in the exposure of a long-accepted error."

The charges so distinctly made by the Duke of Argyle soon received a warm reply. It was held he had charged the leading scientists of England with a "conspiracy of silence;" that they were so anxious to guard the memory of Darwin and to preserve his theory that they had refused to investigate truth; in other words, had formed a "Trust," or what we now know as a "Combination," to exclude all competing discoverers and prevent by silence free discussion of scientific questions, and discourage investigators, and by so doing they were guilty of conspiracy. Professors Huxley and Bonney replied warmly, the former not only to the duke but to a preacher whom he calls "Anonymous," and said, "For, not content with misrepresenting science on its speculative side, 'Anonymous' attacks its morality; thus: 'For two whole years investigations and conclusions which would upset the theories of Darwin on the formation of coral islands were actually suppressed, and that by the advice of those who accepted them, for fear of upsetting the faith and disturbing the judgment formed by the multitude on the scientific character, the infallibility of the great master. . . .'"

Prof. Huxley denies the truth of this, and says, "The charge thus brought by 'Anonymous' affects the honour and the probity of men of science; if it is true, we have forfeited all claim to the confidence of the general public."

Prof. Bonney was not less decided, and says after quoting the duke's article,—

"This is plain speaking. In words that admit of no ambiguity, the duke declares that Darwin was wrong; that Mr. Murray set him right: and that the latter instead of receiving a welcome, was met with a virtual conspiracy of silence on the part of scientific men." He denies the first two, and says,—

" . . . We come then to the third charge, which is

the most serious one, because it affects the morality of scientific men ; and many of them, like myself, are old-fashioned enough to resent being called a knave more than being called a fool. Has Mr. Murray been met by a conspiracy of silence?" He denies this also and shows that it cannot be true, and adds, "Men of science are justly sensitive on this question. Doubtless they are not more exempt from human frailty than any other class of men ; we all fail sometimes, nay too often, to live up to our ideal standard ; still such shortcomings are not common, and anything like a 'conspiracy of silence' or any kind of scientific boycotting is a thing so improbable as to be almost incredible."

This, then, of the scientific men of the day. You may reply that these are questioners of pure science, or not connected with medical practice or its temptations. True ; but physicians would claim to be actuated by scientific motives, and be governed by the same liberal principles, be under the same moral obligations, and wish to rank among those who are bidden by their diplomas "to own no master but Truth."

Let us turn to law. "I hold," says Lord Bacon, "every man a debtor to his profession from the which as men do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends, to be a help and ornament thereunto. This is performed in some degree by the honest and liberal practice of a profession when men shall carry a respect not to descend into any course that is corrupt and unworthy thereof, and preserve themselves free from the abuses wherewith the same profession is noted to be infected ; but much more is this performed if a man be able to visit and strengthen the roots and foundations of the science itself, thereby not only gracing it in reputation and dignity, but also amplifying it in perfection and substance."

Here again is the obligation to serve their profession recognized as binding on its members. And it is a position, "as one sees the long line of scholars, poets and sages, and reads of the college cloisters and quadrangles of Oxford and Cambridge, whose very stones seem happier for being there," to desire that our profession should take its place among them, and say, "These are for us too." So we all felt a great pride when dentistry was admitted to universities, and dental schools established. Now we wish for such advance in liberality that they shall not be training schools where the useful and needful only are taught, but where dentistry is taught as a liberal,

free, and learned profession : and rightfully hope that the universities will raise the teaching of dentistry to the university standard, and not lower the university standard so that graduates in dentistry cannot claim to be the equals in liberality with those of divinity, law, and medicine.

Who would have expected that Dr. Rollins, one of the brightest men who has been graduated from the Central School at Harvard, could have written what I shall presently quote, and still less that it should have passed uncontradicted by any dental school or society in America ?

"So long," he writes, "as members of the profession who patent their inventions and make money on them are honoured to the highest extent in our power by being asked to be leaders in our schools and before societies, so long will dentistry remain a trade, and I for one shall be ashamed to use my dental degree."

Is not dentistry in a position to resent this ? Resent it if we please ; still, like unsettled questions which have no respect for the repose of nations, it will not down if true.

A leading American practitioner writes me, "We are fast becoming a mere tender to a trade association, and about all the liberty there is left us is the right to buy goods."

Is dentistry, then, in a different position from that of other professions that claim to be liberal ? There are, of course, those who have taken the degree of Doctor of Medicine as covering the whole, and who do not care for a partial degree in medicine or surgery : others find that the recognition of the dental degree by the American Medical Association is all that is needed : but these leave the point untouched. Has the dental profession of to-day the morals and atmosphere that entitle her to be called a liberal, free, learned or scientific profession, and to rank with divinity, law, and medicine ?

It will not do to trust to medical degrees to entitle dentistry to this position, for they may be obtained for use as a pass-word or for patronage or influence ; and a medical degree or education, or membership in the American Medical Association, intended strictly for publication and not as a guarantee of faithful assumption of the liberal obligations they have always implied, will not avail much for the elevation of the profession.

There are some who quote the irregular practices of off-colour physicians as affording a shield for themselves, and a

hope that the American Medical Association will not look too closely into dental exclusiveness. To be of real value to dentistry, the recognition of it must call on us to leave quack ways and methods behind. We are not ambitious to rank with off-colour physicians, or to make by reason of patents and secrets an off-colour section in the association. We do not want it to shut its eyes to violations of the code to admit us, and thus step backward. Let them provide that all papers, clinics, and exhibitions given be up to the standard of the other sections, or else their recognition of dentistry will be a curse and not a blessing.

Since, then, we are to go behind the degree to the teaching, from the title to the doing, we ask, is dentistry, with all its titles and degrees, in a different position from the professions that rank as liberal?

The student of divinity must satisfy the denomination which he elects of his fitness, comply with the laws of the State, and so long as he conforms with its tenets need not fear that one of his brothers will invent a scheme of salvation which he will sell to a company which will charge him for its use, or will keep to himself the "exclusive right to make, vend, or use" it; but, on the contrary, may look forward to the day when some university or seat of learning shall give him, as among its highest honours, the title of Doctor—*Teacher of Divinity*.

The student in law must pass his examinations, comply with the laws of the State and the rules established by his profession, and may then be free to serve his clients, and may avail himself of all the past and present experience of others without let or hindrance, and need not ask consent of a fellow-member to improve a process or serve one, for no one of them has by patent the power to prevent him, or is the owner of a secret (legal) remedy.

To be continued.

TO AVOID displacement of small pieces in soldering, by frothing of borax, rub up with your flux and water on your slate, a minute quantity of gum arabic.

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LONDON, JULY 1st, 1889.

PROFESSIONAL ETHICS.

Dr. MERIAM has more than once done the profession yeoman service by his writings. In his trenchant sentences and bold honesty of expression we find a refreshing contrast to much of the catch-penny utterances of trading dentists, which disgraces the profession. In Dr. Meriam's paper, which appears on another page, we find certain broad principles laid down which, although the paper was written for and read in a meeting of Americans practising our profession, apply with an equal force to the profession at home. As in America, certain dentists take a medical degree as an additional earnest of their proficiency, so here we are constantly told that the coming man will be equipped with the M.R.C.S., L.R.C.P., as well as the L. D. S. Contrasting the dental with the medical profession, Dr. Meriam strives to show that whereas the latter sets its face against advertising, the use of patent and secret remedies, the dental profession has less compunction in the use of proprietary articles. There has been a strenuous effort made by a section of the profession to deal with and prevent the development of trade instincts among practising dentists, but even the associations which condemn these practices, condemn them in certain cases only, and admit traders into their counsels.

That dentistry has a distinct trade side none will deny. Some persons will go further and declare the elevation of dentistry to the status of a profession is nonsensical, and the

rank mere brevet. But these men are in the minority, and are probably better fitted to take the social rank which they aim at in their calling. Whether in England the medical profession is so free from commercial ideas may be open to grave discussion. Four-pence for a visit and a bottle of medicine does not cast a shower of glory over the "doctor" who tempers his charges to this attenuation, any more than does the much-advertised set of grinders obtainable for one guinea elevate the dentist who furnishes such miracles of cheapness and nastiness. The English College of Physicians has a bye-law compelling its Members and Fellows to forego the practice of patenting remedies, of entering into trade or trade partnership with persons in trade, and it also debars them from using secret remedies. But these restrictions in no way bind the majority of the profession, for the Members and Fellows of the College, taken together, constitute but a small proportion of a profession whose members are reckoned by thousands. Much as we respect the better class of medical men, we fail to see that the code of ethics used by the rank and file of that profession is so high or so broad as to render it in any way desirable that dentists should be contented to adopt it. Again and again we have urged that the dental profession should take its stand side by side with the medical, but should carefully avoid being absorbed into its body politic. That dentists should be surgeons and physicians *to enable them to recognize diseases traceable to the teeth*, and to remedy them, we have consistently taught, but this is a very different matter to seeking to merge the dental into the medical profession. Again, the question of ethics as between dentists and doctors has many sides, and should, we affirm, rest upon a somewhat different basis in the two cases. Dentists have, we are told, a special weakness for advertising and for making money out of manufactured goods. To see the provincial and town papers proves the truth of the first libel, and we find, if the reports of meetings of Dental gatherings are accurate, that even first rate men among us vaunt secret or proprietary articles *sans peur et sans reproche*.

Again, it is a custom in certain quarters to allow a percentage of profits to medical men introducing patients, while sometimes the premium is managed in a less distinctly commercial manner, but the same principle is carried out. If we are to regard dentistry as a profession and not as a catch-penny calling, its code of ethics must be sufficiently high to render these practices impossible, because the world would then recognize the tree by its fruit. At present it recognises the tree by its presumed cheapness, and the man who appears inexpensive while he manages to best the patients, is at present often the pecuniarily successful man. That the advertising men find it harder to live each year is recognised, and that, in spite of the columns of "interviews" published by the lower type of dailies. But upon other ethical questions the profession does not, at present, act with sufficient harmony. It is only a few years ago that some of the proudest among us used means of getting practice which we all now decry; and now, in the matter of whole-souled morality, we are not unanimous, trade circularism lending a friendly hand, for a friend who sells some nostrum or patent preparation is regarded as a venial offender against ethics, provided the offence is done by ourselves. We fear we have yet much to learn upon this subject, and we commend Dr. Meriam's paper for careful perusal.

PRIZE DISTRIBUTION AT THE LONDON SCHOOL OF DENTAL SURGERY.—The Medical Staff and Lecturers have issued tickets for the Annual Conversazione to be held on July 17th. Sir John Tomes F.R.S. will receive at 8 p.m., and the prize distribution be undertaken by the Rt. Hon. The Lord Kinnauld. Edison's Phonograph will be exhibited and the Musical Society attached to the Hospital will discourse sweet music. These evenings are as a rule exceptionally well managed and enjoyable and are looked forward to alike by students the staff and their friends.

HINTS ON CROWN WORK.—Dr. Patrick advises for band-gold :—Pure gold $\frac{1}{2}$, coin gold $\frac{1}{2}$. Band solder :—band-gold, as above 89, silver 7, copper 4. Crown cusps :—pure gold 15, platinum $1\frac{1}{2}$. Cusps solder :—band solder, as above, 89, silver 7, copper 4. It is recommended by Dr. Evans to make your crown collar of platina and iridium, which will not tarnish from acid oral secretions, and irritate the membranes.

PHENOL CAMPHOR.—Phenol camphor is prepared by dissolving three parts of camphor in one part of carbolic acid. This produces a rather thin, clear, yellowish liquid, with a strongly camphoraceous taste and smell, which mixes readily with fatty, alcoholic, and ethereal liquids, and easily dissolves cocaine, salicylic acid, iodoform, and other bodies. Phenol camphor prevents suppuration ; it combines the cooling effects of camphor with the antiseptic properties of carbolic acid, and, unlike the latter, is painless in its action, and does not show acid properties. It is a preparation which commends itself in dentistry on account of its powerful germicidal and doedorising properties.

SULPHUR FOR SETTING CROWNS.—Dr. H. Dean's method of procedure is as follows : The root and crown having been prepared he applies the platinum loop of the electric cautery and heats the canal as hot as is safe and pleasant. If the canal is not dry the cement will not adhere. With the loop at a low heat smear the inside of the canal and the end of the root with sulphur, and while it is still warm take the crown in the fingers that you may not get too much heat, and heat the pin and heavily coat it with melted sulphur, then place it in the root, pressing firmly, and at the same time getting the alinement. In a few moment all is cool and fast. If you wish to remove or change the position of the crown, take a small pair of straight forceps and heat the beaks quite hot, grasp the crown and in a few moments the cement is soft and you can do with your tooth as you please.

A BEAUTIFUL AND DURABLE CEMENT FOR RINGING BALSAM MOUNTS.—To a thick solution of gum arabic add a little glycerine to prevent cracking. Ring balsam mounts with this first, then finish with the same cement coloured with magenta, or fuchsine, or the “Diamond” black dye dissolved in water. Ornament with gold paint, etc., and finish with mastic picture varnish. Try cement on a blank slide: if brittle when hard, add a little more glycerine, so that it will harden in twenty-four hours without brittleness. A correspondent of the *Microscope* speaks highly of this cement.

EPILEPSY FROM DENTAL IRRITATION.—Dr. Brubaker, of Philadelphia, writing in the *American Journal of Nervous and Mental Diseases*, quotes a collection of sixteen cases he has made, in which epilepsy was shown to be dependent upon the existence of carious teeth, overcrowding of teeth, or abnormal states of the gums preventing the cutting of teeth. In all the cases quoted the removal of the source of irritation was so immediately followed by a cessation from fits as to lead to the conclusion that this form of irritation is even more productive of epilepsy than has hitherto been believed.

THE TEETH OF CENTENARIANS.—Prof. Humphrey some time since examined fifty-two centenarians—a few short of 100 years old and none over that age—as to their physical condition in various ways, and has the following to say in regard to their teeth: “Twenty-five had no teeth, and the average had four or five, which often were of little use. Artificial substitutes were employed in a few cases, with probable benefit to the maintenance of health and prolongation of life. The upper teeth had disappeared totally more frequently than the lower ones. There was not much difference between the men and women. The natural span of life and the dental span—*i.e.*, the time of lasting of the natural teeth—was about equal, and beyond that life was prolonged by the accessories of civilization.”

A NEW DEPARTURE ON BRAZING AND WELDING.—The cheapening of oxygen by Brin's process of manufacture has put into the hands of metal-workers a new power. Mr. Thomas Fletcher writing to a contemporary says, I have recently made a few experiments with the compressed oxygen and coal gas, and found that with a $\frac{1}{2}$ -inch gas supply a joint could be brazed in a 2-inch wrought-iron pipe in about one minute, the heat being very short, the redness not extending over one inch on each side of the joint. The appearance of the surface after brazing led me to experiment further with welding, a process which is not possible with ordinary coal gas and air, owing to the formation of magnetic oxide on the surface. Contrary to my expectation, a good weld was obtained on an iron wire $\frac{1}{4}$ -inch in diameter with a very small blow-pipe, having an air-jet about $\frac{1}{32}$ -inch in diameter. This matter requires to be taken up and tried on a large scale, for such work as welding boiler plates, which, it appears to me, can be done perfectly with far less trouble than would be required to braze an ordinary joint. The great advantage of this would be that the boilers would require no handling, but could be welded with an ordinary large-blow-pipe in position, and with about one-tenth the labour at present necessary. The cost of the oxygen is trifling, and it is evident from the results obtained in brazing, that the consumption of gas would be considerably less than one-fourth that necessary with an air-blast irrespective of the fact that welding is possible with an oxygen blast, whereas it is not possible if air is used. The surface of iron, heated to welding heat, by this means comes out singularly clean, and free from scale, and a small bottle of compressed oxygen, with a blow-pipe, and a moderate gas supply, would make the repairs of machinery, boilers, brewing coppers, and other unwieldy apparatus, a very simple matter. the trouble and difficulty of making good boiler crowns, which so frequently "come down," would be very small indeed, when the workman has an unlimited source an unlimited source of heat at command under perfect and instant control.

TO MAKE SHEET-WAX FOR TRIAL PLATES.—Writing in *Archives of Dentistry*, Dr. H. E. Beach says, Take, of pure clean wax, anywhere from one to five pounds, put in a tin, bucket, or any deep vessel, with clear water sufficient to fill it within two and a-half inches of the top. Set on the stove till thoroughly melted, then set aside until partially cooled ; skin all the air bubbles off. Then fill a smooth, straight bottle with *ice* water, a bucket of which you should have by you. Soap the bottle and dip it deliberately in the solution two or more times, according to the thickness you desire your wax. After the last dip, as soon as the wax hardens to whiteness, cut a line through it and remove it from the bottle as quickly as possible. Spread to cool and straighten out smooth while warm. Continue this process until all the wax is made into sheets.

Any office boy or girl can do the work, and make enough sheet-wax in an hour—equal to any you can buy—to last a whole year. Paraffine, or paraffine and wax, may be made in the same way, and coloured and perfumed to suit one's fancy. The water in the bottle should always be kept cold in order to get the best results."

THE FIRST POST-GRADUATE DENTAL SCHOOL.—While in England we are still discussing the advisability of holding Post-Graduate Courses, in America a much more vigorous line of action is being pursued. Nothing less than the establishment of a Post-Graduate school in Chicago. "Let the profession," says an American writer, "know that such a school is established on the right basis, and many will seek instruction therein in methods new." The success of a post-graduate dental school conducted on the highest plane of such institutions, is assured beyond question. Surely we should do well to devote more thought in the matter and aid in the development of classes on a more permanent basis in England.

RESTRICTIONS ON SURGEONS IN THE MIDDLE AGES.—The following curious rules are said by an American contemporary to have actually been in vogue. The fees, judged by our present ideas may be regarded as “moderate.” “No surgeon must open a vein of a woman or a daughter of the nobility without being assisted by a relative or a body-servant ; *quia difficillium non est, ut sub tali occasione ludibrium interdum adhærescat.*” (Their morality was then a subject for caution.) “When a surgeon is called to dress a wound or treat a disease, he must take the precaution to settle on his fee, for he cannot claim any in case the patient’s life is endangered. “He shall be entitled to five sous for operating on hard cataract. If a surgeon wound a gentleman by bleeding, he shall be condemned to pay a fine of one hundred sous and should the gentleman die following the operation, the surgeon must be delivered into the hands of the dead man’s relatives, who may deal with the doctor as they see fit. When a surgeon has a student he may be allowed twelve sous for his services as tutor.”

PIANO-WIRE BROACHES.—Dr. W. N. Morrison demonstrated the making of broaches from wrapped piano-wire, at the last meeting of the Missouri State Dental Association. His manner of making them is to take a piece of wrapped wire long enough for the broach and handle, about four inches : he unwinds the outer wire from about half of the piece, letting the remainder serve as the handle. The uncovered portion is ground into the form of a broach by the use of two corundum wheels of the same diameter, placed side by side on the lathe mandril, leaving a slight groove where they touch. The wire is held in this groove and ground to the proper shape : the wire is kept revolving to grind it round. Dr. T. G. Vernon improved this broach by soft-soldering the end of the outer wire.

Abstracts of British & Foreign Journals.

DENTAL COSMOS.

ANTIPIRETICS, ANTINEURALGICS, AND ANALGESICS.

BY EUGENE L. CLIFFORD, D.D.S., Chicago, Ill.

ANTIPYRINE is an alkaloidal product of the destructive distillation of coal-tar. It may also be prepared synthetically. It has the chemical formula $C^{11}H_{12}N_2O$, and the chemical name di-methyl-oxy-chinicine, being derived from the hypothetical base chinicine (or quinzine), which itself is a derivative of chinoline. It is also known as methozin. It occurs as a whitish crystalline powder which combines with acids to form salts; is somewhat bitter, and soluble in half its weight of hot water and in its own weight of cold water. It is less soluble in alcohol, chloroform, or ether. It gives an intensely red colour with ferric chloride, and a beautiful green with nitric acid. It is not irritant to either the stomach or the tissues, and may be administered hypodermically. The maximum dose for an adult is 30 gr. hourly for 3 hours or 90 grs. in 24 hours. For children, one grain for each year of age, for three successive doses. If vomiting result the same dose may be dissolved in half its weight of hot water, and injected hypodermically while warm. Antipyrine has little flavour. Hypodermically, seven and one half grains dissolved in water is an average dose, though double may be given.

Physiological Action.—Powerfully antipyretic, local anæsthetic, and a general analgesic. It also possesses diaphoretic, mydriatic, antiseptic, disinfectant, hæmostatic, and slightly hypnotic properties. After the ingestion of a full dose (gr. xxx) there is a stimulant stage, of short duration, in which the heart's action is increased, and a subjective sense of heat is experienced, with flushing of the face. This is soon followed by profuse sweating, coldness of the surface, slowed pulse, and considerable depression, and, if fever be present, by lowered temperature, the latter coming on within half an

hour after taking the drug, and its degree, as also its continuance, being in direct ratio to the quantity administered. In health its administration gives rise to slight nausea, singing in the ears, and a slight reduction in the bodily temperature. It slightly raises the arterial tension, may induce vomiting, and a peculiar eruption of the skin, and very rarely a state of collapse. It is a sedative. It is eliminated by the kidneys. In toxic doses it separates the hæmatin, causing decomposition of the blood. As an antipyretic it acts.—1st, by diminishing oxidation; 2nd, by causing loss of heat by dilating the cutaneous vessels, allowing free radiation from the surface, and by the refrigerant action of the evaporation of the sweat. It gives great relief in cases of trauma, also in cases of acute pericemental irritation. In reflex neuroses of dental origin it is a prompt and powerful remedy. In all cases of hyperpyrexia, in all cases of neuritis of rheumatic origin, whether from cerebral or spinal centres, in almost all neuralgias it is useful. The hypodermic use of antipyrine is said to be as effective as that of morphine, without the unpleasant after effects. It does not interfere with nutrition nor lead to a craving. In acute dental periostitis the use of antipyrine gives good results. Injections should always be made under the most careful antiseptic precaution. An induration and swelling surrounding the point of injection will be found upon the following day, indicating a local cellulitis, but sloughing or other untoward symptoms have not been noticed. Experiments have also been made, with favourable results, in the direct application of antipyrine in saturated solution, in acute pulpitis, as also in combining equal parts of antipyrine and arsenious acid for the destruction of the pulp; but the number of cases of the latter, however, has not been sufficient to permit an absolute opinion: of its value upon the cocaine toxæmia Dr. Ottolengui writes: “It (antipyrine) is a *grand* drug, but already the medical fraternity are calling a halt and using it more carefully. *Don't inject it.* Fifteen grains given internally is preferable from the stand-point of safety, and will serve with sufficient efficacy—I am speaking from personal observation. I have used it without a failure, though only a few times, for pericementitis, and once with marked success, as follows: Patient came complaining of aching tooth; pulp almost exposed, but no actual lesion discovered; capped and filled the tooth with oxyphosphate. Next day tooth quite tender, though not elongated, and aching. Fifteen

grains of antipyrine in half-ounce of water produced sleep in twenty minutes, and the tooth has not ached since, two weeks later. The name ACETANILIDE, a synonym for antifebrin. Like the larger number of the new antipyretics which are related either to chinoline or to phenol, acetanilide is a derivative of anilin, from which it is obtained by the action thereon of glacial acetic acid. It is a pure white crystalline powder, of neutral reaction, odourless, but of slightly burning taste soluble in alcohol, wine, etc., but very sparingly in water. The dose ranges from 2 to 15 grains repeated twice, but not exceeding 30 grains in 24 hours. A convenient prescription is

R.—Acetanilide, $\mathfrak{z}$ i ;
 Sp. vini gallici, $\mathfrak{z}$ ivss ;
 Syr. Simp.,
 Aquæ aa, $\mathfrak{z}$ vi.

A tablespoonful containing five grains, a fair adult dose.

Another :

R.—Acetanilide, $\mathfrak{z}$ ii ;
 Alcohol, $\mathfrak{z}$ ii ;
 Glycerin.,
 Syr., Simp., aa $\mathfrak{z}$ iii ;
 Aq. Cinnam., $\mathfrak{z}$ i. M.

Sig.—One-half to two teaspoonfuls every two to four hours according to age or necessity (each teaspoonful containing two and one-half grains).

Physiological Action.—Acetanilide is a very efficient antipyretic, strongly analgesic and antispasmodic ; lessens the reflex action of the spinal cord, and inhibits the sensibility of the sensory nerves. It raises the arterial tension somewhat, and slows the heart in a corresponding degree. A toxic dose destroys the ozonizing functions of the blood, forming methyl-hæmoglobin. The heart, liver, and kidneys are found in a state of acute fatty degeneration in animals poisoned with it. Compared with antipyrine, the effect of acetanilide upon the body temperature is slower but lasts longer. Acetanilide also differs from antipyrine in being a cerebral, muscular, vasomotor stimulant, and a marked diuretic, while antipyrine is powerfully diaphoretic, a cerebral sedative, and produces great depression. Acetanilide acts with but one-fourth the dose, but its action, like the latter, begets tolerance of its action. There is neither vomiting nor diarrhœa after its exhibition, but there is a tendency in some few cases to collapse, with chills and cyanosis, especially the latter.

These drugs are composed.

Antipyrine.

Large dose
Quite bitter
Soluble in water.
At first stimulant, afterwards depressant.
Nausea, vomiting, and diarrhea.
Skin manifestations.
No effect on respiration.
No cyanosis.
Local anæsthetic ; hæmodynamic.
Little or no effect on the normal temperature.
Analgesic.

Acetanilide.

Small dose.
Nearly tasteless.
Insoluble in water.
Cerebral, muscular, and vasomotor stimulant.
No nausea, vomiting, or diarrhoea.
No skin manifestation.
No effect on respiration.
Tendency to chills and cyanosis.
Pernicious influence on the blood, anæmia following a continued use.
Little or no effect on the normal temperature.
Strongly analgesic and antispasmodic.

Fifteen grains of acetanilide, in divided doses, every 24 hours, for only a few days may produce bad symptoms. A patient has died from it. The conditions noted would certainly tend to show an obstructed circulation, an interference with the proper oxygenation of the blood, some possible cardiac pathological condition, but above all to impress upon us the fact that such a medicament is to be handled with caution. A cyanotic condition is never produced by antipyrine. The quality of the drug shall be assured as samples. Neither of these drugs should be administered conjointly or alternately with opium, sweet spirits of nitre, or belladonna. Four-grain doses of acetanilide repeated every hour till three doses have been taken, the patient keeping the recumbent position, are said to subdue nervous or sick headaches. Of PHENACETINE he says—

1. It is an efficient antipyretic.
2. It does not develop any disagreeable or noxious after-effects.
3. Small doses suffice.
4. It is perfectly tasteless.
5. On account of its innocuousness and tastelessness, it is valuable for both adults and children.

6. It is a powerful antineuralgic, its effects being more energetic than antipyrine, and that it does not cause lassitude or other disagreeable symptoms. Very slightly soluble in water, a little more so in glycerin, but most freely in alcohol. Experiments have proved it to be most reliable, comparing favourably with all other anti-neuralgics without any of their deleterious effects. No nausea, no vomiting, no diarrhoea, no collapse, no cyanosis, no depressing after effects follow its use. In fact, I have failed so far to find but one condition in which its administration was thought to be ineffective, and that so far is supposititious. That condition is a deficiency in the quantity of lactic acid in the stomach. Phenacetine is thought to produce its slow but sure effects by slowly dissolving in the lactic acid of the stomach; consequently, in those cases, which are few, where the results are negative, the investigators are disposed to believe it is for the want of a sufficient quantity of this acid to dissolve it. It is valuable in all neuralgic conditions. Phenacetine is not a narcotic, but an antineuralgic aside from its strong antipyretic action. The mode of action is probably a direct influence on the central nervous system, that of the vaso-motor nerves more especially, for phenacetine acts especially on vaso-motor neuroses, which fact, with its diaphoretic powers, indicates principally a powerful effect on the circulatory system. Phenacetine is of reliable action, and produces certain effects, free from all untoward and disagreeable symptoms. As an antineuralgic the dose is from 8 to 22 grs., 15 grs. being an average dose, and is indicated in vaso-motor neuroses, in the lancinating pains of locomotor ataxia, and in the various forms of neuralgia. Phenacetine is a strong analgesic, more powerful in its action than perhaps antipyrine or antifebrin, and it acts very rapidly in spite of its insolubility in the gastric juice. About twenty minutes after its administration its effects may already be observed. It does not produce cyanosis like antifebrin, and, in contradistinction to the latter, its presence in the urine may be detected, ferric chloride giving a red and cupric sulphate a green colour to urine containing phenacetine.

BRITISH MEDICAL JOURNAL.

ON AN OUTBREAK OF SYPHILIS FOLLOWING
ON TATTOOING.

BY SURGEON F. R. BARKER, M.B., LOND.

NOTES are given of twelve cases which came under observation at Portsea Hospital. Twenty-three men in all, were tattooed by one man S., a discharged soldier, of these twelve were watched, and the clinical history of the disease watched, four had syphilis before, five escaped any consequences although there was no history of a previous attack in their cases it were stated that S., did not put his metals in his mouth, and did not use his saliva in any way. Two deserted their comrades, said that both had a bad term previous to desertion. The man was found after some trouble, and on being questioned stoutly denied even having had syphilis, but confessed having contracted gonorrhœa. A sore was noticed at the angle of the mouth, and on his opening his mouth to facilitate examination, the mucous membrane was found covered with mucous tubercles, and the hard and soft palates ulcerated. He was asked if he had a chancre on his penis, but this he again denied; on examination there was a deeply pigmented scar, on the glans penis. He said that came about a year ago, and being very poor at the time he was unable to obtain treatment for it. His arms were examined and condylomata were found. He owned that he had wetted his finger with his saliva and rubbed it on the wound, but denied having ever mixed his colours with his saliva. The men said that the needles were in some cases dirty as if used before, that the same pattern was used several times over, that S. wetted the arm with saliva, one saying he was in the habit of spitting on the arm during the process, and one stated he saw S. mix his colours with saliva. Incubation period varied from 13 days to 87 days. Three that were tattooed the same day had incubation periods of 29, 47 and 59 days respectively. *Nature of the Sore.*—It is the most remarkable feature of these cases, that out of the twelve examined, five should have presented a distinct rupial form, namely, Cases iv., v., viii.,

x., and xii., and that Case ii. should have had secondary rupiæ at the seat of the Hunterian chancres. In no case in which rupial ulcers formed was there a single sore, but their numbers ranged from two to four. In no case did rupiæ form in other parts of the body. Rupiae forming at the seat of the primary sore are, the writer believes, exceptionally rare, and always thought they were regarded as tertiary manifestations; but here we have them as primary or early secondary. In the article on Syphilis, by Mr. Jonathan Hutchinson, in the *Dictionary of Practical Surgery*, it stated that rupiæ never occurs very early amongst the secondary phenomena, its usual place being from six to twelve months after the chancre, I was sent a copy of photo, being that of Case iv., to Mr. Hutchinson, who wrote, "I have repeatedly seen primary chancres, when occurring on the naked skin, assume more or less closely the features of rupiæ. You will see one of those figured in my clinical illustrations in connection with syphilis from vaccination, in which the sores had much this aspect. I may admit that I have never seen the simulation quite so clear as is figured in your photo." The rupiæ when seen were of the rupiæ prominens form resembling limpet shells, and when they fell off left a plain, not an excavated base.

ARCHIVES OF DENTISTRY.

USE OF COCAINE—A CASE IN PRACTICE.

BY CHAS. GOTTSCHALDT, D.D.S., of New York.

Mrs. C., age 28, in good general health, had two lower wisdom teeth attacked by pyorrhœa alveolaris. They were loose and irritated the surrounding soft parts very much. Extraction and cocaine was advised, used hyperdermically. The left lower wisdom tooth being the most troublesome was selected, and about five drops of a 4 per cent. solution was injected. After the elapse of five minutes the tooth was removed attended by very little pain. The effects of the

cocaine seemed to pass off in a few minutes more, and the patient went home. A few days she stated she had suffered during the night (after giving cocaine) from nervousness and irritability, nausea. The next day the appetite was bad and a desire to go to sleep, to which latter she finally succumbed and felt better next morning. Several of her other teeth had tartar extending high up on the roots, and to avoid pain cocaine was again used, this time locally. This was followed by tingling in finger tips and a general uneasy feeling, going through nearly the same steps as the first dose had produced. Some time after it was decided to remove the other wisdom tooth which had become a great source of annoyance. Again cocaine was used hyperdermically, this time a 10 per cent. solution of which six drops were injected into the exceedingly painful soft tissue around the tooth. The outside of the gum was last injected. The needle was hardly withdrawn when the patient complained of feeling badly. Face pale and covered with cold, clammy perspiration; lips drawn, bloodless and seemed to stick to the teeth; mouth dry; feeling of constriction in the throat; numbness or anæsthesia of surface; dyspnœa distressing; pulse rapid, weak, and almost imperceptible at wrist; mind clear. She was placed in a horizontal position, the head a little lower than the body, and nitrite of amyl inhaled. A severe rigor soon came on and lasted for 10 or 15 minutes, which hot stimulants and blankets relieved. Very soon the pulse, as also to a certain extent the respirations, improved under this plan; a "cold streak," however, remained along the spine. In 20 minutes more the lady felt comparatively comfortable and we concluded to have the tooth for our trouble. The lady was put in the sitting position and while reaching for forceps the first attack came back with renewed vigour. Her physical appearance, this time, was somewhat exaggerated over that of the first attack; pulse absent at wrist and scarcely perceptible at neck; first sound of heart apparently absent and second very indistinct; respiration very shallow and about four per minute. It was for long feared that the fluttering in the region of the heart would cease, for it seemed to get weaker with every respiration. Nitrite of amyl, constant, stimulate in small but constant doses, recumbent position and external warmth constituted the treatment. This condition lasted nearly one hour when gradually the symptoms passed off. While applying the nitrite of amyl: the heart would by successively stronger

beats come to near its normal strength, when, instead of remaining so, it would drop, not gradually, but suddenly back to its fluttering state. The injection was made at 4 p.m. and at 6:30 p.m. the lady was able, with assistance, to stand on her feet. A feeling of extreme exhaustion continued for several days; dyspnoea continued for 8 or 10 days, finally becoming less and less marked and ceased altogether in the course of about two weeks.

WASHING AMALGAM.

BY DR. B. O. STEVENS, Hannibal, Mo.

Referring to an article from Dr. Ingersoll of Iowa, in regard to washing amalgam the writer objects in three respects to its conclusions. 1. To squeezing it until placed in the cavity, as the process of squeezing causes it to set; and when you break it, to place in the cavity it is more difficult to pack, as it has commenced to harden; it takes more time and is difficult to remove all the water and soda. A fresh packet of amalgam he washes thoroughly with alcohol three or four times until the alcohol does not colour. He then spreads it on a clean piece of paper and lets it dry, then places it in two large mouth vials and leaves them unstopped. While it may cause it to oxidise if spread out to the air. He thinks good amalgam sets more evenly and slowly when left in an open-mouthed vial. When a package is first opened it sets quickly and works harsh, but when left uncorked for a few weeks it sets slower and works more evenly. The wash from my amalgam he puts in his lamp, and in a few months a great deal of clay-like dark substance accumulates, which, if mixed with mercury is slow to set and when hard is very dark and brittle. He believes if this is left in the fillings it causes them to have dark, brittle edges. He recommends to mix amalgam in the palm of the hand, places it in the cavity in small pieces, and burnishes thoroughly to the walls with warm smooth instruments that will reach all irregularities. If the cavity gets wet he places in a piece of cotton and allows the patient to expectorate. Then starts again by drying with bibulous paper and warm instruments, burnish down thoroughly; the filling will take a good polish in five minutes after it is finished, if you have not used an excess of mercury.

"PREGNANCY AND DENTAL OPERATIONS."

BY SAMUEL R. PERCY, M.D., New York.

"Neglected roots of teeth are specially liable to become abscessed during pregnancy, and in the extraction of these, the greatest difficulty is likely to occur." A question arises, "are neglected roots of teeth specially liable to become diseased?" and how can they be prevented from becoming so. At this period the woman has two beings to nourish, herself and her foetus. After the fifth or sixth month the foetus makes an extraordinary demand for a large supply of phosphates, and if it cannot be supplied in abundance by the food, absorption of phosphates from the bones takes place and teeth that are partially decayed are partly absorbed, but not to the same extent as the alveolar processes and the gums. The woman became nervous and exhausted for want of phosphates. If she cannot get a sufficiency of phosphates, she really becomes "exhausted" and is soon in a state of disease—a very frequent form of disease, phosphate starvation. A case in point is cited: Patient had suffered three miscarriages, and was again pregnant at about the third month. She was very much exhausted, nervous, fretful and sleepless. Her lips were swollen and sore, her gums were spongy, her teeth were loose; she had jawache and neuralgia; her appetite was very dainty and she could not eat any solid food. Her urine was utterly devoid of phosphates. She was ordered a good warm milk diet and hypophosphites every four hours, a weak mouth-wash of myrrh, camphor and carbolic acid with $\frac{1}{60}$ gr. of corrosive sublimate to each mouthful. Paying special attention to the mouth and teeth we soon found that she improved so that a little meat was added to her milk diet. With the continued use of the hypophosphites she gained very rapidly, phosphates reappeared in her urine. The mouth soon became healthy, the teeth were not loose and she could freely use her tooth-brush with a proper tooth-powder. She went to her full term and a small child was born, which upon a healthy nurse soon became strong.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, held May, 6th, 1889.

MR. FELIX WEISS, L.D.S., *Vice-President* in the Chair.

The minutes of the preceding meeting having been read and confirmed,

Messrs. Henry George Read, 30, Finsbury Square, E.C. L.D.S., M.R.C.S., L.R.C.P., L.S.A., and Thomas George Read, 31, Cavendish Square, W., D.M.D. Harvard, were ballotted for and elected Resident Members.

The Chairman called upon the Librarian for his Report.

The Librarian (Mr. Ashley Gibbings) : I have only to report, Sir, the receipt of the quarterly Journals, including the "Journal of Anatomy and Physiology" and the "Journal of Microscopic Science," also several periodicals from Mr. Harding.

The Curator (Mr. Storer Bennett) reported : I have received two molar teeth, a lower molar and a lower molar root very largely exostosed. They were removed with great difficulty, and are presented to the Society by Mr. John Worsley.

Mr. Charters White said : Sir Richard Owen at the meeting of the International Medical Congress eight years ago reminded his hearers that "Knowledge is power," but pertinently asked, "but what of half knowledge?" I am afraid that a full knowledge of any subject even in these progressive times is scarcely to be expected, far less realised, for the deeper our acquaintance with any branch of study, the more cognizant are we of greater depths lying beyond, and we are therefore fain to rest content with much that may be characterised as "half-knowledge." This, in my opinion, is our position now in relation to Antiseptic Dental Surgery. Antisepticism in its various phases has furnished us with many encouraging examples; thus ovariectomy and other branches of abdominal surgery, before the introduction of the antiseptic treatment, were truly regarded with dread and misgiving, but are now of daily occurrence and attended

by almost constant success ; so again, in surgery of the thoracic region, the use of antiseptics has given a boldness to the operator while holding out a cheerful prospect of successful recovery to the patient. This is denied to us and our patients ; we cannot, in our laudable desire and endeavour to carry out the canons of conservative dental surgery, stand up before our patients and conscientiously assert the perfect success of our attempt to save a tooth which will be free from pain ever afterwards. It therefore behoves us to carry our investigations in the regions of antiseptic dental surgery to their fullest extent, and leave no antiseptic agent untried till we find one whose action leads on to unvarying success. Until we do so we cannot say that we have passed the boundaries of "half knowledge," and consequently of half the power a full knowledge would endow us with. In the after treatment of devitalised pulps the antiseptic is the main factor of our success, and it is in the application of an agent whose action is thorough and complete that we may look for the best results. Forty years ago, creosote in combination with arsenic and morphia was employed in the destruction of the exposed nerve, but in my experience it did not prove successful, and was attended with much pain ; afterwards the creosote was superseded by carbolic acid, from the local anæsthetic effects of which much less pain was inflicted and the morphia was found unnecessary, a mixture of arsenious acid with the carbolic acid being all that was needed to complete the almost painless destruction of an exposed pulp ; this, after repeated dressings with sanitas or eucalyptus oils, which depend for their efficacy upon their contained peroxide of hydrogen, ended in a fair percentage of success, but since then an antiseptic agent has been employed by me without in any case disappointing my expectations during the last nine months, that I felt it might be due to my brethren and our patients to call attention to it. We all know full well that oxygen is a most powerful destructor of all effete matter, that dead and decomposing atoms are speedily burnt up by its *ereima causis* ; hence peroxide of hydrogen, being 60 times more powerful than carbolic acid, 20 times more so than salicylic acid, and 40 per cent. more potent than mercuric chloride, has long occupied a foremost place amongst dental antiseptics. Perchloride of mercury is another powerful antiseptic, being fatal to pathogenic

organisms even when used in most diluted proportions. The new antiseptic I wish to introduce to your notice is a combination of these two, 5 per cent. mercuric chloride in combination with 5 volumes of peroxide of hydrogen, and known as Kingzett's Bactericide. By the kindness of Mr. Charles Kingzett I am enabled to place a few samples on the table for distribution to those who would care to try it. In its present strength it is too strong and powerful for surgery use, but may with advantage be reduced by adding $4\frac{1}{2}$ ounces of water to every $\frac{1}{2}$ ounce of bactericide. According to the researches of Koch, a solution of mercuric bichloride of a strength of 1 to 5000 destroys the vitality of all spores in a few minutes, therefore it may safely be diluted to the proportions given by Mr. Kingzett, namely: "To prepare a solution containing 1 part of HgCl_2 in 1000, add 1 drachm of bactericide to 6 ounces of water—in other words, 1 part of bactericide in 50 parts of water should be employed." I do not recommend the mixing of a large quantity at a time, as peroxide of hydrogen loses its potency by keeping, and should at all times be kept well corked and in a dark place. Another precaution must be observed in the use of the bactericide: no metal instruments that you care for should be allowed to come into contact with it as it corrodes them to a serious extent, therefore in mopping out a cavity with a pledget of cotton-wool saturated with it, I keep one instrument for that purpose, but for syringing the solution into pulp cavities, or the fistulæ of alveolar abscesses I use glass tubes drawn in a flame to a capillary point and bent at different angles, the large end being capped with an elastic teat such as are attached to the tubes for filling stylographic pens; with any number of these having various curves any part of the mouth can be reached conveniently.

I am convinced that there is no surer road to a successful result in the dental use of antiseptics, and by which we may pass from that state of knowledge in which we may consider this subject to be at present and by which we can extend its boundaries to the fully known, than by watching the effects produced by the various agents introduced to our notice, such for instance as the one I now recommend, and modifying their proportions in such a manner as experience may suggest till the same unfailing, unvarying success attends our efforts on behalf of those suffering ones who seek out aid, as that which

characterises the antiseptic treatment of our brethren in pure surgery.

The Chairman: The subject which Mr. Charters White has brought before us is one of deep interest. As everybody knows, corrosive sublimate of the strength 1 in 5000 is sufficient for most purposes. It is recommended by the Metropolitan Board of Works. The only fault of the bactericide that I might refer to is that peroxide of hydrogen is so easily decomposed.

Mr. Walter H. Coffin: I should like to say, Sir, that I think very highly of the combination which Mr. Charters White has remarked upon, but I may say that if it requires, in the opinion of those who use it, to be so largely diluted with water, I would recommend that it should not be diluted with plain water but with solution of peroxide of hydrogen, otherwise the peroxide will become decomposed. I think, Sir, a 5 per cent. solution keeps very well, but the strong solutions do not become very liable to degenerate to a 5 per cent. solution.

Dr. G. Cunningham (Cambridge): I should like to corroborate the remarks of the last speaker, because I have been in the habit of using a similar preparation, viz.: a combination of peroxide of hydrogen, using a ten vol. instead of a five vol. solution as mentioned, and mercuric chloride of different strengths. I also use mercuric chloride 1 per cent. solution, and should have no hesitation in using it to syringe out a pulpless tooth under the rubber-dam. Of course we know that we can use a 1-1000 solution freely in the mouth without the protection of the rubber-dam. We are able to use stronger solutions even without the protection of the rubber-dam, providing great care is taken. As an apparatus for the purpose I think the small syringe suggested by Dr. Elliott is the best, being superior, in my opinion, to the glass tube and rubber arrangement, because the platina tube attached to the hard rubber stock, carrying the small soft rubber bulb, is sufficiently fine as to nearly coincide with the diameter of the canal. They may be used for a long time without being deteriorated by the action of chloride of mercury.

Mr. Storer Bennett remarked that Mr. Robbins the chemist manufactured a preparation of peroxide of hydrogen which he (Mr. Bennett) had found to be more stable than the solutions in common use. Mr. Bennett had found the common hypodermic syringes, sold for 3s. at the Dépôts, were the most

efficacious for injecting canals. These syringes are preferable to the glass ones of which Mr. Charters White spoke, as they are not liable to break.

Mr. C. J. Boyd Wallis narrated a case which, having been seen by Mr. Charters White, that gentleman added supplementary facts.

The patient, having been much troubled by a tooth, consulted a provincial dentist, who at first filled it with gold. As this failed to give relief, the filling was drilled into and the cavity was filled with amalgam. Although the nerve was destroyed no permanent relief from pain was achieved, so the tooth was extracted. A Donaldson's barb was then found embedded in it; this was removed, the canal filled with gold, and the tooth replaced. Subsequently pain recurred and the patient came to Mr. Charters White, who removed the tooth and found the root much eaten away by the pus which existed around it.

The Chairman then called upon Mr. David Hepburn to read his paper. [See page 557.]

At the conclusion of Mr. Hepburn's paper,

The Chairman said, Well, gentlemen, here we have a thoroughly practical subject for your consideration. I will not offer many words myself, but I must state that I have had an objection both to suction valves and air-chambers, and everything except the accurate fit of the denture. Where a good model has been taken, I have rarely had any difficulty in holding up a piece of work. I have seen some cases where much annoyance has been caused by the soft tissues growing into the suction chamber. Where you have a good fit, I repeat, you will have little difficulty in holding your case up.

Dr. Walker: I think, Sir, we are much indebted to Mr. Hepburn for his kind services in introducing the subject. So far as my experience goes, Sir, in regard to suction chambers, Mr. Hepburn has hit the point completely, but when we get thoroughly edentulous upper maxillæ with very greatly absorbed surfaces, the suction chamber becomes necessary to retain the plate *in situ*. Again, Sir, Mr. Hepburn speaks of the soft tissues freely passing into the suction chamber, but I think he omitted to say that this would not occur if the dentine was only worn sixteen hours a day.

Mr. A. Kirby (Bedford): My own experience coincides with yours, Sir, if great care be taken to prevent hard pressure

on the median line. After taking a careful model I find it an advantage to fit the piece into place with an ordinary piece of blue manifold paper. It marks the precise line where there is excessive pressure. In addition to this, I always use a modification of what we know as the Fulsome ridge. I think it was described by Mr. Walter Campbell I at once adopted it. I do not make the spurs pass round the whole of the palate, but only on the soft tissue on either side. Even when the palate is very flat, I find it is the only expedient necessary.

Mr. G. Brunton (Leed) : Some years ago Mr. Fletcher said his idea of a suction plate was to have a large number of small cavities distributed over the plates. Following this idea, I made plates accordingly. Passing a piece of sand-paper with the gold plate through the rollers produces the reticulated surfaces. I have some hundreds of these plates in use now.

Mr. J. Fairbank : I think Mr. Hepburn's remarks are of great value, and very correct. I think suction chambers are not needed in artificial dentures. I have never on a single occasion made use of them myself. I think they only weaken the plate and make it feel thicker. I think a very useful thing to do in whole dentures is to scrape the palate on each side of the median line ; if you examine the palate in most mouths you will find that on each side of the median line the mucous membrane is very much softer and the palate is thicker than on the ridge. Where I find the suction fail in suction plates it has been from the plaster warping ; if the plaster is not good it will sometimes do this.

Dr. G. Cunningham : I should like to say a few words as a patient. Unfortunately my upper jaw is all but entirely edentulous, as I have only two wisdom teeth left. I made some experiments in my own mouth some years ago with a view of ascertaining whether it was possible to make that desideratum of all patients, a narrow suction plate. I tried a long, narrow, curved suction chamber just inside the palatal surface of the alveolar border. After considerable perseverance I was able to wear it perfectly well, but I found no advantage in it, and I came to the conclusion that patients' notion as to the smallness of the plate is a false one ; and further, from previous experience that there is no necessity for a suction chamber at all. I may tell you that I have been something of a victim to suction chambers since I found that there was a gradual and continual enlargement on the palate corresponding

to each successive chamber. That enlargement has not increased in my own case since I found that it was not at all necessary to wear a suction chamber, and that a spur modification of the Fulsome ridge answered perfectly well. In determining the position, the height and breadth of the ridge, an examination of the mouth should be made with a blunt instrument such as an egg-shaped burnisher, to ascertain the softer and thicker parts of the tissues covering the palate. With regard to suction discs themselves, I think that Land's is the best. He also recommends the spur arrangement as well, and advises the largest possible disc. The writer of the paper requested some information with regard to suction valves. I remember on one occasion having a very troublesome case: the plate was a very heavy one, and I was anxious to try some discs of soft rubber; I did so, and it was a disastrous failure. I think suction valves might possibly be of some use for the retention of temporary plates where much absorption was anticipated.

The Chairman then called upon Mr. Kirby for his paper. [See page 561.]

At the conclusion of Mr. Kirby's paper,

Mr. G. Brunton (Leeds): I should like to say that I am highly delighted with Mr. Kirby's paper, and am quite repaid for having left a rather busy practice to come and hear it. His motor comes nearest to what I think a motor ought to be, but I hope to see it even improved. I would like to see one so light, so small, and compact that it might be mounted on one's shoulder.

Mr. C. J. Boyd-Wallis: Mr. Kirby in his very interesting paper has left us little to criticise, but there are one or two points he has just touched upon, and upon which I should like to make a few remarks. I think it is an important point, and one which is nearly always overlooked by amateurs, and sometimes by practical electricians, in the make-up of a battery to arrange the cells so that their internal resistance shall equal the resistance of the circuit, so that the maximum current for a given circuit may be obtained.

With regard to transformers, electricians are devoting their energies to the discovery of the best methods of constructing these instruments, and I am informed that it is likely we shall soon have an instrument which will enable us to transform the current in the leads for the powerful mains to our own houses and use the same with perfect safety. Transformers employed to transform either direct or alternating currents of high

electro-motive force (of, say, 200 volts) should be placed in a fire-and moisture-proof casing. The leads conveying currents of high E.M.F. inside buildings should be specially and perfectly insulated, and with the positive and negative terminals some twelve inches apart.

There is one other point Mr. Kirby has just touched upon, viz., the treatment of tumours. In the treatment of fibroid and other growths, I consider it a very important point that the resistance of the patient should be ascertained, for the resistance of the human body to the passage of the electric current, differs so enormously in different individuals and indeed in the same individual under varying conditions of health, and at different periods of the day, and it will be readily understood that what may prove a very big dose of electricity to one individual may prove practically *nil* to another.

Mr. Kirby : In reply to the last speaker, I may say that the necessity of the external and internal resistance being the same is not exactly as I understand it. It is advantageous to have your external resistance considerably higher than your internal. By far the most economical way of using your current is to use it with a very high external resistance. Then, as regards transformers, with an intermittent current this is not so. With regard to tumours, the quantity of electricity passing through the tumour can be accurately gauged. Dr. Parsons in his article in the *British Medical Journal*, says that he commences with a very low quantity, and he reads from a galvanometer as he increases it.

Mr. Boyd-Wallis : It is only quite recently that medical men have adopted the practice referred to ; hitherto they have used one 6-cell battery.

The Chairman : It now devolves upon me to thank Mr. Kirby for his interesting and valuable paper. It is not the first time that we have been benefitted by his experience and excellent judgment. We have also to thank Mr. David Hepburn for his paper, and the other gentlemen for their communications. The last meeting of the session will take place on the 3rd June, when a paper by Dr. Ferrier, F.R.S., will be read on "Some Relations of the Fifth Cranial Nerve" ; a casual communication by Mr. Scott Thomson on "A Case of Irregularity" ; also one by Mr. J. Robinson and Dr. George Cunningham, "A Few Preliminary Remarks on the Occurrence of a Crystal-forming Micro-organism in the Mouth."

Dental News.

NEW JERSEY STATE DENTAL SOCIETY.

The nineteenth annual sessions of the New Jersey State Dental Society will be held at the West End Hotel, Asbury Park, commencing Wednesday, July 17th, 18th and 19th. Prominent dentists from throughout the country will read interesting papers and the clinics will be more than usually instructive. Everything new and useful in operative and mechanical dentistry will be exhibited by the inventors and dental supply houses for whom spaces will be reserved. Low hotel rates will prevail.

CHARLES A. MEEKER, D.D.S.,
Secretary.

ROYAL COLLEGE OF SURGEONS OF ENGLAND. PASS LIST.

The following gentlemen, having passed the necessary examinations, were admitted Licentiates in Dental Surgery : —Black, Arthur, 8, Harley Gardens, S.W. ; Colyer, Arthur Reginald, Hazelden, Thurlow Park Road, S.E. ; Crassweller, Charles Walten, 6, Ashmore Road, W. ; Dunlop, John, 1, Portland Road, Kilmarnock ; Elphinstone, William Robb, 41, Hunter Street, W.C. ; Faro, Richard Sidney Newman, 82, Upper Gloucester Place ; Field, Edgar Albert Hector, 30, Lorrimore Square, S.E. ; Fogg, Arthur, Slieghbury House, Stoke-on-Trent ; Lonnon, Frederick, 77, Denmark Hill, S.E. ; Morris, John, 159, Kingsley Road, Liverpool ; Peckover, Charles Edward, 14, Pavilion Parade, Brighton ; Porter, Frank Constable, 2, Richmond Terrace, S.W. ; Rushton, William, 57, Devonport Road, W. ; Timms, Samuel Day, 54A, Westbourne Street, S.W. ; Wedgewood, Herbert Williamson, 293, Friern Road, East Dulwich ; Wood, Robert Earnest, Horeham Manor, Sussex.

APPOINTMENT.

Pedley, S. Edward, M.R.C.S., L.R.C.P., L.D.S., has been appointed anæsthetist to the National Dental Hospital, vice J. F. W. Silk, M.D., Lond., resigned.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

SOME METHODS OF "CROWNING" USING ENGLISH
TEETH.

To the Editor of the "British Journal of Dental Science."

SIR,—In reply to Mr. James Rymer, who in your issue for June 15th, criticises the curing of a chronic abscess due to non-use of a broken-down tooth by crowning it entirely new; I beg to remind him that one of the elements of treatment in surgery is to remove the exciting cause of an abnormal condition; now the cause being non-use it appears scarcely new to correct it by use.

Every case of chronic abscess from the above cause I have treated by crowning and enabling the offending root to take its place in mastication, has been followed by a dispersion of the abscess within a few days. The rationale of the abscess is I believe due to nature abhorring an useless member, therefore the broken down tooth acts as a source of chronic irritation to the adjacent tissues, but when crowned and bitten, the tooth again coming into use the surrounding part is stimulated and the inflammatory products removed by the blood-vessels and the lymphatics. The decomposing matter in the root canal I beg to point out to Mr. Rymer is not left to be absorbed as the rubber dam is adjusted, the constriction at the neck will cut away, all *debris* of tooth and pulp removed, the canal made aetiseptic by well washing out and drying, and the apex sealed with a solid root filling. In cases of much broken down teeth I shape the root, make a band to fit it before treating the canal and use the band to hold the rubber dam on the stump.

Faithfully yours,

June 22nd, 1889.

THOS. G. READ.

British Journal of Dental Science.

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REMOVABLE BRIDGEWORK.

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At the recent meeting of the Midland branch of the Dental Association held in Liverpool, amongst other matters of interest brought before the notice of the members, bridge-work formed an important item. At one of the demonstrations a piece of bridgework was inserted in the mouth, the bridge being non-removable. During the casual communications at the afternoon meeting, cases of bridgework, removable and otherwise, were handed round for the inspection and criticism of the members. Among others, one, the chief features of which was a gold bar (fixed at each end by means of a gold filling), which carried the teeth, the latter being fastened to the bar by a piece of springy gold, which was soldered by one end to it. When slightly separated from the bar, the saddle to which the teeth were attached, was forcibly pushed over the bar and thus kept in place. While admiring the principle of being able to remove the teeth from the bar, I was not satisfied with the mode by which that end was attained. Perhaps if I give the details of the operation of a case I have recently inserted it may more clearly explain the method I have adopted. Miss T—— had lost the first and second upper bicuspid on the left side, and was anxious to have the lost teeth replaced, but was strongly averse to wearing a plate. On examining the mouth, I found the left upper canine had a large amalgam filling on the distal surface, and the molar an amalgam filling in the centre of the crown, the gum between these two teeth was healthy. At the first sitting I drilled out both these fillings, opening out the cavity in the molar to its anterior surface and the cervical edge, the

pulp being unexposed in each. An impression of the upper and lower was then taken in godiva, and the patient dismissed. A gold bar, about 16 British Plate gauge, was next made, the ends of which fitted into the cavities, and the intervening part accurately adapted to the gum. Across the centre of this bar a small slot was filed. A gold saddle was next fitted to the bar and to the bite. This was made in two parts. A piece of gold about 18 British Plate gauge was bent to fit the side (lingual) and top of the bar, and a second piece of gold, not so thick, about 23 British Plate gauge, being the side to which the teeth must afterwards be soldered, was fitted to the outside of the bar, and soldered to the first bent part. This now accurately fitted the bar. Through the top of the saddle directly over the slot before mentioned, a hole was drilled and a piece of gold wire long enough to enter the slot soldered to the saddle. This prevented any sliding of the saddle upon the bar. The teeth, two canines, were fitted to the gum, backed, invested, and soldered ; these had now to be soldered to the saddle. Bar and saddle were placed on the model, and the teeth secured to the latter with wax, lifted off, and the teeth and saddle invested and soldered. Two holes were drilled through the lingual side of the saddle and completely through the bar. These were tapped and the orifices in the saddle countersunk. Two gold screws were cut, the heads fitting the countersinks. A screw-driver, for using in the mouth, can readily be made from an excavator. At the second visit from the patient, I fixed the rubber dam, leaving it over the gum between the two teeth to be operated upon. The canine was filled over the floor, internal and external walls, and the molar over the floor, with gold. The bar with the saddle screwed to it, was then fitted into its place, so that the teeth pressed firmly into the rubber covering the gum, and held in that position whilst fossiline was thoroughly packed into the cavity of the molar to hold the bar. When quite set, the saddle was unscrewed, and the gold filling in the canine finished. The fossiline was next drilled out, and the gold filling in the molar completed. The rubber was cut away and the saddle and teeth went perfectly into position and were screwed up tightly. The great object of the guide pin and slot, is, that you are absolutely sure of having the screw holes of the saddle opposite those of the bar throughout the operation. The lingual side of the saddle should be of sufficient thickness to allow of giving a somewhat natural contour to

the plate, and the upper portion is, of course, articulated to the bite. It is, perhaps, too much in these days to claim anything as original, but I certainly think for removable work (which must necessarily commend itself as in the case of a fractured tooth) this plan will be found, in suitable cases, to answer the expectation of both operator and patient.

PROFESSIONAL ATMOSPHERE AND MORALS ; OR PATENTS AND SECRETS VS. A LIBERAL PROFESSION.

BY HORATIO C. MERIAM, D.M.D., Harvard University
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Concluded from page 576.

THE student in medicine must reach the educational standard of his school, comply with the statutes of the State regulating the practice of medicine, and he is free also within these limits. He may have made or may improve instruments without permission of his fellows ; may perform operations without obtaining a *license from a company or leave from another*. He may ask the formula of any medicine that claims to be scientific, call for aid in consultation when ever needed : call for information, as a right expect a reply giving it—all by reason of being a liberal, or member of a liberal profession. He may be sure that he is at liberty to perform an operation he has seen done at a hospital clinic without fear of subsequent litigation ; may order instruments without fear that litigation will prevent their delivery.

Now, is the dental profession as free or as liberal ? For years we were under the Rubber Company, the last part of the time through the purchase of a patent from a dentist. The present Tooth Crown Company will hold the profession, if successful, by virtue of aid given by dentists, by the men who formed it being received at clinics and introduced without the improvements or operations being given fully to the profession. In fact, to use a homely illustration, they were "given with a string tied to them so that they could be pulled back—and the profession pulled in."

The student in dentistry is taught with patent instruments,

uses daily filling-materials whose formulas the instructors do not know ; and, after passing examinations and fulfilling the legal requirements of the State, must, if he wishes to practise all that is published in his text-book regarding operations, pay, or buy a license from others, or expect litigation. He will find the instruments of his profession so handicapped with patents that all makers are not at liberty to serve him. They can withhold, or decline to make, and refuse to permit others to do so. This power has been given them by his brothers, who have sold to them the "exclusive right to make, vend, or use." They can direct him to cease improving an instrument, because they have brought from a brother the patent which covers it, and have thus secured this power. Even a better instrument cannot be introduced when this power has been sold to those outside of the profession. If he is studying any question which involves instruments or processes, he may find himself obliged to ask the permission of his brothers to work at the problem, or else I mistake in my reading of the foot-note to an article by Dr. Bogue in the *Dental Cosmos* of March, 1885, where we are informed that "Dr. Jarvis was the first to separate teeth by means of a screw, that Dr. Perry had improved on this instrument, and that, with the *permission* of both these gentlemen, Dr. Bogue had been working on the problem for several years." These are three well-known names in the profession; one has *had permission* to work on the problem of separating teeth. He may find, after becoming a member of societies and listening to papers read at the meetings, or when he reads his own journals, that papers seem to be written to help the sale of appliances that destroy his independence, that men clinic to advertise instruments, or that clinics are used to introduce quacks or quack methods. That if he ask information at a meeting or clinic regarding a compound he may be refused by the person presenting it ; find, after witnessing an operation, that he must take out a license before introducing it in his practice. This license may involve conditions, and be taken from him at any time for non-fulfilment of them.

It is possible for a Sixth or Eighth avenue dentist to purchase the entire right for New York City, and those who practise between Sixth and Madison avenues become dependent on him for permission to study or use. He may demand the right to inspect books at any time, have them brought to him, or prescribe in what form they shall be kept, have the

lists of patients for whom the operations are performed sent to him as often as need be, and rightfully refer to any he controls as "a man who works for me." It often calls for as much expense in time and thought to prepare a paper or perfect the details of an operation as to invent an instrument, The dentist who is obliged to pay his brother for the right to use instruments, may not be able to invent another, and so "get even." He may, however, be able to devise a new way of filling, or process of construction, and as he cannot dispose of this like an instrument, he must sell to a company who will "work it on the license or royalty plan." For, bear in mind that up to this time we have not been willing to face the question of the falsehood of patents in a liberal profession, but have admitted their place in dentistry, and have only fought to test the legality of those where license and royalty has been asked. We strain at the gnat of the Tooth Crown Company, but swallow without trouble the camel of illiberal patents and secret materials. We should be teachers, not traders, and condemn alike all the men who sell the profession into the hands of trade. At the present time some are selling the control of instruments to makers, others processes and operations to companies who wish to license; thus providing an upper and a nether millstone between which the great body of the profession can be ground exceeding small.

Many patent defenders say that a man should get his pay for time and labour. With this simple statement there can be no quarrel. The professional view is this: that in getting his pay, he is under moral obligation not to injure his profession, nor by reason of his invention give power over the profession or any fellow-member to any one. That if by reason of it he has aided oppression of makers of limited means, or has subjected them to litigation, he makes himself and the profession a party to illiberal motives and tendencies. In a liberal profession mutual help, exchange of thought, whether embodied in instruments, essays, or consultations, should be a sufficient compensation, and it is so held in the medical profession.

I read with shame and professional humiliation of a teacher who makes an appliance of a secret material, patented so that no one else can make it, sold through a "sole agent" to combination dealers only. Exclusive in conception, exclusive in execution, exclusive in manner of distribution. When this is the teacher, what will be the student?

I am frequently met with the remark, "I guess if any of these professional fellows got up a good thing they would patent it and make what they could out of it." True, perhaps, but I have yet to learn that that is the question under consideration. The point is, that having done so and secured from the government the power to prevent all others from "making, vending, or using," without my consent, the power to put fellow-members under tribute, or sold to others that right, can I claim a right to continued association with them on equal terms? Can I claim to be a liberal member of a liberal, *free* profession, having aided to bind it? If a man will not work, neither shall he eat. If he will not give, how can he claim the right to receive?

Our constitution secures patents as property, but there are higher powers than constitutions. Patents were legally granted under it for explosive bullets, but civilised men have not used them against each other, as the object of modern warfare is not to destroy life, but to settle questions.

According to Blackstone, the government grants a patent in return for such information as placed on record will enable others to construct or use the article or process after the period for which the exclusive use was granted has expired; in this way overcoming the tendency of mean natures to conceal information, or withhold knowledge from others.

"If your work be mean," says Emerson, "try by your thought and feeling to make it liberal." Physicians, as members of a liberal profession whose first object is not to acquire power, are by reason of their membership under obligations to teach, and do not need the stimulus of a patent to make them record knowledge or aid each other or mankind; and while the constitution will give them the right to patent, they do not wish, as honourable gentlemen, to avail themselves of the power it gives to exact or withhold from each other what their privilege of membership in a liberal profession always implies should be given freely.

I went through the Children's Hospital, in Boston, and after passing through the wards asked to be shown the workshop where their instruments and apparatus are made. I said to the surgeon who attended me, "It is as important that you should have those men under your control to make as you direct, as to control the nurses. Allow them to patent those instruments, or patent each improvement that helps you to overcome some new difficulty, and sell the control to them,

and it would be but a few years before they were exercising more authority over the instruments used in the hospital than you." Then I told him the whole story of the shameful, illiberal condition of dental practice : that instruments ordered could not be delivered on account of the quarrels and litigation among makers ; that honourable practitioners had been forced by threats of litigation to take out licenses to perform operations and pay a commission on the amount received,—were obliged to allow the company liberty to examine their books ; that I had heard that upwards of a hundred orders for one instrument could not be filled, because dentists had sold to makers the power to control instruments their fellow-members needed ; that valuable instruments could not be introduced because patents were thought to cover them ; that certain instruments were held for lease and not sold, that a license and percentage were to be charged for their use, and that this licence could be revoked at any time for non-payment. He exclaimed in astonishment, "Are dentists in such a hole as that?"

The commercial value of a patent is often in the power it gives, not in the time spent on it, or its ingenuity, nor its value to the profession ; and a maker, seeking to control a market or an instrument, will not look except to the valuable vantage point that he can secure by purchasing it. If one by buying a patent on an instrument can prevent competitors coming into the field, that will be the value of the patent to him. A patent, of little or no value on its merits, may thus be the key to a legal situation, and others may be ruined by a bought patent. It is interesting to notice that the same class of minds that justify patents in dentistry also justify secret preparations and the refusal to teach improvements or give information, and the formula of materials or medicine and their true or scientific nomenclature. Thus patents are only part of their offending against the standard set for a liberal profession, and thus the real object—exclusiveness—becomes apparent. Others seek to turn the question from patent right to copyright, though I have not heard them mention the book whose owners have formed a company and worked it on the "license or royalty plan." When copyright is used like patent right, so that the consent of the author or owner must be asked before operations can be performed, and companies are formed to license, permit, or appoint those who shall have the right to act for them in cer-

tain territory, it will be the duty of those who guard education and the liberal profession to include that also, among those things that debar from membership or association.

A defender of patents in dentistry, in writing to a medical journal, makes this humiliating confession regarding the subserviency to trade to which they have reduced dental societies: "Our dental inventions are not," he writes, "shut up like those of our medical *confreres* in one city or in one society, but are shown in practical use at all the clinics of the State societies, either by the inventor in person, or a practitioner *appointed by a dental firm* who holds the right of manufacturing."

Are the appointments of the surgeons who operate in the hospitals of your city made by firms who own and manufacture instruments? Is this right of manufacturing ever sold without *the power to threaten* or to *sue* other dentists who may be improving instruments that may infringe or compete with it? One would suppose that pecuniary interest would be enough to debar from a meeting or clinic those things in which practitioners had a financial interest. For in a meeting a member is at once judge and jury and witness; and Garretson says, in writing on expert testimony, "that the scientific man who appears in the witness box as an advocate cuckolds science." And are our societies, schools, and journals less in importance? Mr. Justice Gray, of the United States Supreme Court, left the bench and did not take part in hearing "The Telephone Case" merely because a relative was a stockholder: and no lawyer can be asked to try a case before a judge or jury who would be financially interested in the result of the verdict.

In clinics all should be given as part of a scientific and professional demonstration, not as a sign-board to point the way to the shop of some exclusive maker. Clinics are best defined as "*bedside teaching*," but our neglect of professional obligations has reduced them to bedside *peddling*. I doubt if there is a dental society holding clinics to-day that is not introducing illiberal practices.

The dignity of the professional teacher requires that clinics shall not be used as advertising boards for patent instruments or materials, but that all operations taught in them should be performed with free instruments, and should be as free to be allowed as any operations in the hospitals of your city by the surgeons witnessing them. On nearly every society pro-

gramme I see the names of teachers in our colleges, who, by reason of their patents on the instruments to be used in the clinics, make it not unfair in us to suppose they derive a pecuniary benefit thereby ; and I, Mr. President, who am a simple man, and perhaps foolish enough to think that men who desire to be classed as belonging to a liberal profession should strive to show the outward or visible signs or forms of one as evidence that they are possessed, also, of its inward or spiritual grace, have been sadly troubled whether to class these gentlemen as "college teachers" acting as depot-steerers, or "depot-steerers" acting as college teachers.

If we are to be satisfied with menial positions because they pay best, well and good. Some cooks receive a larger sum per annum than some college presidents ; but I have not heard that our universities have, as yet, given up teaching the humanities to train cooks, nor that the latter are asked to grace our platforms on commencement days.

Let us be spared the mortification of knowing that any member of a body that calls itself a liberal profession, governed by moral and professional obligations, has been so false to them as to assist litigation among our instrument-makers by selling to them for money the power to destroy the men of small capital, and has stood by consenting to their commercial death. The man who can say, "I will go with makers when they pay me more than societies," prostitutes professional position. There should be no underground railroad running between the editor's chair and the shop of the maker or dealer in instruments. The editing of a journal should be done with as much understanding of The Code and what constitutes a liberal profession as any service it receives. All professional matters should be given importance, and all trade interests equal terms. No article should appear in the reading pages written in behalf of materials in which editor or publisher have pecuniary interest. They should have no connection with trade so that it would be to their interest to delay or prevent publication of the freest discussion of the requirements of practice, or any topic that the profession chooses to take up. A journal must be the outspoken mouth-piece of an outspoken profession ; for to allow the advertising pages to be controlled by any one dealer mars the professional standing of the whole journal. For a member of the profession to lend his name as editor to a journal whose publisher is likewise an instrument maker, who refuses to admit

or continue advertisements of competing makers, is to tarnish professional character and the independence of the editor as well. Let the reading pages be open to the introduction of practical matter and improvement also. Let them find a place beside the microscopist for a description and illustration of the wonderful blow-pipe of Prof. John S. Thompson, of Atlanta, Georgia, and beside the pathologist for the machine for cutting engine-burs invented by Dr. E. B. Call, of Peoria, Ill. We cannot expect them to be given equal importance in our journals if they are not conceived of by the inventors, the profession, and the society, as services due to it by reason of membership. For many of these omissions the blame rests at our own doors. Had the beautiful mechanism perfected by Dr. Perry, and known as the Weber-Perry engine, been completely described and illustrated so that any practitioner could have had one made by a competent instrument maker, when first invented, it would have become the absolute property of the profession; and what better service can be given to-day than the invention and presentation of a dental engine that may be made by any instrument maker, and rank as a professional surgical instrument?

From a scientific, moral, or professional stand-point, it would seem almost incredible that the editor or publisher of journals claiming to represent the profession should know of valuable instruments, and not mention them in their journals, be the owners of processes of manufacture that are not published, or should be concerned in hindering their use by others. It is disgraceful even to be suspected of hindering a professional or scientific man from obtaining anything he wishes to use in his work, that they should be concerned in suppressing competition, or give men who violate the medical code prominence in their journals. Yet the statement is freely made that processes of use to the dentist are not printed by editors or publishers of our journals, though known to them for years.

Dentistry cannot ignore the mechanical, but must clothe it with honour as the orthopædic surgeon has done, by bringing what enters into our practice under scientific and liberal control.

With the combination of instrument-makers and others called by those who compose it the "Dental Trade Association," we are concerned, as it affects our profession. It is not something we are at liberty to discuss if we wish; but if

its effects are such as to keep dental requirements from the usual channels of medical and other scientific supplies, or to hinder competent persons engaging in our service, it becomes a question that it is our duty to discuss, and one which we have no right to omit.

The evil effects of patents and secrets in the profession are manifested as well by their effect on our instrument-makers; they have become so thoroughly debauched by them that the first question seems to be always, not to supply what is needed, but to make that of which they can secure exclusive control either by secrets or patents.

The advantage gained by a patent or secret process encourages the aggregation of interest; and, having secured the power to prevent all others from making one instrument, it was but a logical step to form an organization which should secure the control of all the requirements of dental practice, and under this system those who have patents or secrets to sell will receive more consideration than those who wish to introduce professional or open articles in which there may be subsequent competition.

Some time after graduating I became interested in gutta-percha, followed it as well as I could from supply to source, and gave all I knew freely to students and societies. I received one day an application from a dealer who has been asked by dentists to procure it for them. I replied as follows, —I omit names, of course, because this is not a fight against persons, but for a principle.

“Yours of is at hand. I shall be much pleased to aid you in getting a gutta-percha filling before the profession, and will teach freely all I know regarding it to any one whom you may select. I shall require in return that it be professional in every way. Its formula must be printed both on the label and circular, both to be made out as directed by me. It must then be ranked among physicians’ and surgeons’ supplies, and sold at a uniform wholesale rate to all druggists, dental depôts, makers and dealers in dental and surgical instruments, etc. Regard for the standing of the profession, and my position as a teacher at the dental school, will not permit me to use my name except under these conditions.”

Were there any conditions imposed that any physician or teacher should not require? Yet the substance of the reply I received was: On business principles we could not accept

the conditions you mentioned ; it would be too much of a departure from business plans of the past for us to undertake."

It was certainly my duty to require what I did, and I presume also, the gentlemen who wrote me felt it their duty to "The Combination" to refuse to supply the gutta-percha as a professional material.

It is not strange if, for a time, our instrument makers fail to understand the position they should take, for we have led a lax professional life, and our recognition by the American Medical Association is but recent. They will now be called upon to abandon secret or patent processes and instruments, and advance to the position of professional and scientific makers.

Our schools can do much for securing competition. It should not be in the power of the agents of any maker to say that a professional school "plays its students" into the hands of one. There is professional propriety in favouring none. There is professional disgrace in admitting but one.

The spirit of Article I, section 4, of the medical code should be sufficient to guide us in the treatment of combination makers :

"Section IV. . . Physicians ought to use all the influence they possess as professors in colleges of pharmacy, and by exercising their option in regard to the shops to which their prescriptions shall be sent, to discourage druggists and apothecaries from vending quack or secret medicines, or from being in any way engaged in their manufacture or sale."

It is clearly our duty under this to take heed that we encourage science by purchasing and using, as far as possible, professional requirements,—those that are free from patents and secrets open to all qualified to make, bearing in mind that the object of the code is not to fight patents and secrets in general, but to keep them out of medicine, thereby providing that it shall continue a liberal profession, and that we may not in buying our requirements aid in degrading our calling. "Millions for supplies, and not one cent in aid of quackery," will be a good motto. We should insist that all aid we give workmen by directing them in the making of our requirements be met with a guarantee that they shall afterwards be handled as medical and scientific supplies, thus recognising that anything has an ethical as well as a useful end, and, unless guarded, may

be used to degrade as well as to aid us. The laws of health and contagion have taught us that if we will not be our brother's keeper he will be our destroyer.

"Sell me this patent; we shall never dictate to dentists," says the instrument-maker. The professional man must answer, "I cannot sell you *the power to do it* even if you do not propose to." For patent does not imply use, but *power* over so much of dentistry as the invention covers, and makers often demand complete control as a condition of making; and once made property by patent, death, sale, financial embarrassment, litigation, all become agents that may remove it from the profession and give its title to others. The fact that they are property is just the worst part of it, and constitutes the danger to a liberal profession. Dr. Hale, in the address quoted at the beginning of this paper, said, "The medical profession brands with infamy the man who makes God's Truth his property." We do not want our calling to depend upon the views of others regarding their property. For not more surely does the wire that runs to our office bring with it the subtle power of electricity, than do patents and secrets subject our profession to all the vicissitudes of a trade.

Those who must advise their sons to follow or not the calling of their fathers may be pardoned for wishing to know if they are to advise them to take an independent calling, or one whose practice on entering they will find involved in continual litigation, and for whom every new operation may include a new terror or degrading condition which absolute ownership by others may impose; though I am free to admit that it will not interfere with the practice of those who find their highest ideal of dentistry in the polish of instruments, in the cohering of gold, in the soldering of bridge work, or in the vulcanization of rubber, "and who daily strive through all life's space in hope to stand well in some maker's grace."

For the *raison d'être* of our profession is not to produce, secure, or use highly-polished instruments. Dentistry should rise to and rest its claims upon its scientific, physiological, and moral purposes and obligations—the preservation and restoration of function, the relief and prevention of suffering and pain, the restoration of grace and symmetry, and the aid it gives that there may be a "sound mind in a sound body." That to do this we should be free as physicians to call to our aid the arts and sciences; they to furnish the means, we to

give the special application. That our needs create and develop instruments ; they are our aids and under our control, or should be, not we to be controlled by them.

We are not trying this case of "Patent Secrets *vs.* a Liberal Profession" before a jury of machine shops, instrument-makers or dealers, the journals they control, their employées, or those members of societies that they hold in leash. We are trying it by the liberal standard set by all liberal professions. Scientific and professional interests call for scientific and professional tests, and discussions on them are not conducted by anonymous writers or paid attorneys. No man who is willing to act in schools, societies, or journals in the pay of an instrument maker can pick a quarrel with us on this question.

I cannot do better than to quote as a witness the honoured head of our university, whose address before the American Academy of Dental Science was the first comparative study of dentistry made by so competent an authority.

"There is another common attribute of good physicians and surgeons which has had great effect to elevate and liberalize their profession. I mean their characteristic zeal for teaching. This zeal is manifested not only in giving direct instruction to medical students, but in imparting to medical societies and the public every important fact observed, every useful practice invented, and every suggestive opinion or promising theory conceived. The constant desire and purpose on the part of its members to teach, to impart to all any peculiar knowledge which each may acquire, is one of the principal distinctions between a liberal profession and a trade. Dentistry would have no claim to be called a liberal profession did not its practitioners manifest this zeal for teaching."

Those who are making this fight for the improvement of dentistry will not be turned by ridicule or misrepresentation, for we know that that can be cheaply hired in the market, but those that oppose us must show that we have misrepresented medicine or the liberal professions ; when they have done that we will beg their pardon and retire from the contest.

THE MICRO-ORGANISMS OF THE MOUTH AND
THEIR ASSOCIATION WITH DISEASE.*

GEO. W. WATSON. L.D.S.Ed.

BACTERIA are minute organisms not as a general rule containing chlorophyll. They are composed of a kind of protoplasin, microprotein of Nencki, and are invested by a membrane formed principally of cellulose, and it is owing to the presence of this cellulose membrane that they are able to resist the action of acids and alkalies. Some species of bacteria are provided with terminal cilia or flagella, and are thereby capable of locomotion, darting through or spinning round in the liquid in which they are suspended. This is exhibited more particularly by certain kinds of bacteria—bacilli and spirilla.

Strong currents of electricity and exposure to direct sunlight act injuriously on micro-organisms. Some bacteria require free access of oxygen for their growth, and are called aerobic (Pasteur); others grow without it, and are called anaerobic. All organisms require for their growth water and nourishing material containing carbon and nitrogen; besides these, certain of the inorganic salts of potash, soda, and ammonia are necessary in small quantities. There is great variation in regard to the temperature most suitable for their growth. Many grow best at the temperature of the blood, the usual range, however, being between 18° and 41° C. Tubercle bacillus, for instance, will only grow at a temperature of between 30° and 41° C. Bacteria show wonderful resistance to the effects of cold and heat. The Comma bacilli exposed to a temperature of 10° C. for an hour, and anthrax bacillus, after exposure to a temperature of 100° C., still retained their vitality. Temperatures over 50° to 60° C. destroy most bacteria, but not their spores: the spores of anthrax are only destroyed by prolonged boiling. Roughly speaking, all pathogenic bacteria grow best at the temperature of the blood, and non-pathogenic bacteria at the ordinary temperature of the room. Bacteria may be grouped according to the products of their growth. Thus, we have pigment-forming, fermentative, putrefactive, and pathogenic bacteria. Chromo-

* A Paper read before the Odonto-Chirurgical Society of Scotland.

genic, or pigment-forming bacteria, produce certain definite colours, thus the micrococcus prodigeosus produces a pigment analogous to fuchsine, sarcina lutea, a yellow colour.

Zymogenic, or ferment bacteria, examples of which are clostridium butyricum, which converts the salts of lactic acid into butyric acid, producing butyric fermentation in solutions of starch, dextrine, and sugar. The micrococci of dental caries, which produce lactic acid, are also examples of this class. Saprogenic, or putrefactive bacteria, play a most important part in the economy of nature, breaking up complex organic substances into bodies analogous to peptones, then into leucin, tyrosin and fatty acids, and, finally, into indol, sulphuretted hydrogen, ammonia, and water. They abstract the elements they require, and the remainder enters into new combinations. Accompanying the formation of these substances are certain bodies which are extremely poisonous when introduced into the blood of animals. These poisonous alkaloids are called ptomaines, and produce a specific poisoning which must be distinguished from septic infection. Several of these ptomaines have been isolated, as cadaverin, putrescin, saprin, peptoxin.

Pathogenic bacteria are those which are genetically related to disease. Many organisms have been supposed to be pathogenic, or have been described in connection with disease, which are only harmless associates. True pathogenic bacteria feed on dead organic matter, examples of which are found on the skin, in the mouth, and, according to Klein, in the liver and internal organs in disease.

Distribution of bacteria.—Bacteria are always present in air, but not in such numbers as is generally supposed; in water they are also present in considerable numbers. In the soil, in sewage, in the intestines, and, in uncleanly persons on the skin and between the teeth, numerous species of micro-organisms may always be found. But in healthy blood and healthy tissues bacteria are never found. If it were not so we would all speedily fall victims to tubercle bacillus or some others, which we in health inhale with impunity.

Classification of bacteria.—As regards the classification of bacteria, this is still an unsettled point, the best classification perhaps is that given by Cohn, who considered them allied to Algæ.

- (1.) Sphærobacteria, globules, micrococci.
- (2.) Microbacteria, short rods, bacterium.

(3.) Desmobacteria, long rods, bacillus vibrio.

(4.) Spirobacteria, spirals, spirochæti, and spirillum.

To these might be added—Mucoides, mould ; saccharomycetes, yeasts.

Methods of propagation of bacteria.—Micrococci divide by fission in one or more directions ; bacteria divide in one direction only ; bacillus by spores and fission ; spirillum, vibrio, spirochæti, fission and spores ; saccharomyces, moulds by spores and fission.

Bacteriological methods.—Description of specimens of different varieties under cultivation exhibited to show their peculiarities of growth, &c.

Fractional cultivation plate, cultivation, &c., explained.
—In the mouth we have very favourable conditions for the growth and development of micro-organisms—heat, moisture, and plenty of organic and inorganic pabulum, and more particularly is this the case in mouths kept in a filthy condition. In such mouths we may even have animal organisms—animalculæ—present, so that the dirty mouth might be described as a zoological and botanical garden.

Different varieties of micrococci, bacteria, spirilla, bacilli, leptothrix, and vibrio are found in the mouth. We are constantly inhaling and swallowing micro-organisms ; but, fortunately for us, the most of those swallowed are destroyed by the gastric juice in the stomach, except the spores of anthrax and other bacilli.

I shall now endeavour to show you, and describe, by means of lantern transparencies taken from my negatives' some of the different organisms which I have cultivated from the mouth, and also some slides taken from negatives lent me by my friend, Dr. Edington, whose kindness and help I hereby acknowledge.

Dr. Miller, of Berlin, separated out and describes some twenty-five different organisms from the human mouth.

I shall commence with the organisms of caries :—

Slide (1.) *Leptothrix buccalis* growing, from piece of carious dentine, L, is a very common organism in the mouth. In caries it is found growing from the external surface of the tubules, and does not penetrate into the tubules until they are completely softened and broken up.

Slide (2.) There are several different varieties of *Leptothrix* and this is one more slender and with longer filaments than that of *buccalis*, *leptothrix*, *gigantea*, long rods, short rods, found



Leptothrix.

x520



Leptothrix growing from carious dentine.

x250

in the mouths of dogs, sheep, cats, and other animals. Cruickshank, in his "Bacteriology," says that leptothrix is found in the mouth in the form of long rods, short rods, cocci, and spirilla, which assertion I very much doubt, more especially as this opinion is taken from some of the works of an older writer. It is very difficult to get a good growth of leptothrix buccalis for examination, but I hope to be able to do so, and report at some future time.

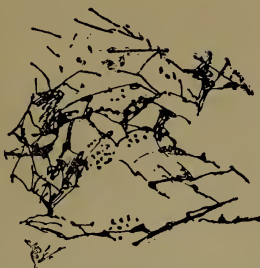
Slide (3.) This slide represents very well, chalky carious enamel. Along with the broken up enamel prisms there are a few filaments of leptothrix, but no other organisms are present, which accords with what Dr. Miller says in regard to this.



Broken up prisms of carious enamel.

x120

Slide (4.) Organisms grown from the deepest layer of carious dentine. With a sterilised instrument the outer layers of the carious tissues was rapidly removed till nearly sound tissue was reached. Some of this was put into a tube of

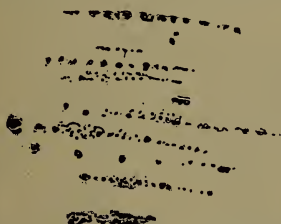


Leptothrix and cocci grown from deep layer of carious dentine. x600

nutrient jelly, and incubated on the third day. The tube was found swarming with leptothrix and micrococci, with liquefaction of jelly, degeneration of growth taking place on the second week. As liquefaction of the jelly goes on the organisms all fall to the bottom of liquid area.

Slide (5.) Micrococcus pure culture separated from above.

Slide (6.) Section of carious dentine exhibiting tubules packed and distended with Micro-organisms.



Section of carious dentine tubules distended with organisms.

Slide (7.) Same, more highly magnified. The organisms which penetrate the tubules are principally micrococci, though sometimes bacilli and spirilla are found, but never leptothrix.

Before micro-organisms can gain admission to the tubules decalcification must have taken place, and this is readily accomplished at weak points of the teeth by means of the numerous ferment organisms found in the mouth.

I quite agree with Dr. Miller that there are areas of softened non-infected dentine which contain no organisms.

Dr. Miller, of Berlin, in his article on dental caries, says that he has been able to produce this condition artificially on sections of sound teeth put into beef extract and sugar, and inoculated with a pure culture of the organisms from caries.

The probability is that this is quite correct, as Dr. Miller has done very good and thorough work in the investigation of the organisms of the mouth; at the same time his experiments have not been confirmed by other investigators. Whenever I can find time and opportunity I hope to take this subject up. There is not the slightest doubt that dental caries can to a considerable extent be kept down by keeping the mouth in a thoroughly clean and aseptic condition—but I shall refer to this further on.

Slide (8.) Bacteria grown from the scraping of the tongue.

Slide (9.) Two epithelial scales from tongue covered with the same organisms, in chain or singly.

Slides (10, 11, 12, 13.) This series of slides show well the variety of micro-organisms found in mouths where no attention to cleanliness is paid. Bacilli, micrococci, bacteria, spirilla, and leptothrix are all present.



Spirillum, micrococci, bacteria,
leptothrix. x500.



From dirty mouth. x700.

Slide (14) Colony of bacilli cultivated from pus taken from a root of the tooth.

Slide (15) *Streptococcus pyogens*.—This is the special organism of suppuration, inoculation with this organism causing the development of an abscess. Improperly cleaned instruments, you can therefore understand, might be productive in the mouth of severe abscess if used on other patients

—or more serious results. *Streptococcus erysipelas*, also pathogenic.



Streptococcus pyogenes organisms of suppuration.

x1040

Slide (16.) *Saccharomyces albicans* or *oidium albicans*.

Slide (17.) One of the yeasts is the organism associated with thrush in the mouth of infants or debilitated subjects.

The mucous membrane is covered with greyish white patches, consisting of epithelial cells, this fungus, and the mycelia of molds. Spore formation is well shown in one of the slides. The preparation from which this photo-micrograph was taken was obtained from the throat of a patient suffering from phthisis. Associated with ulcerative stomatitis, there is found a bacillus, which seems to have a great deal to do with the spreading of the disease in calves, rabbits, and mice. It usually proves fatal, owing to the rapid development of the bacillus invading all the important organs.

Associated with disease.

Slide (18.) Tubercle bacillus, colony of.—I have very good authority for saying that diseased roots and teeth have a great deal to do in starting tubercular trouble in the lymphatic glands of people predisposed to this disease. Tubercle bacilli gaining admission to the jaw through the diseased teeth, speedily infect the structures in their neighbourhood. It would be right, therefore, for us to look well to the teeth of patients having a tubercular tendency, and see that they keep their mouth in a thoroughly healthy and aseptic condition.

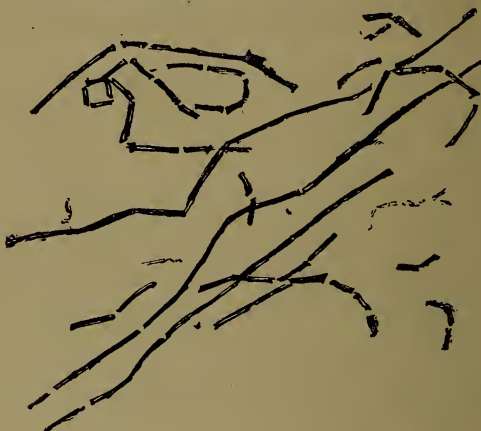


Colony of tubercle bacillus.

x500

Slide (19.) *Bacteria capsiformans*.—A cultivation from the mouth.

Slide (*Bacillus subtilis*.—Hay *Bacillus* frequently found in

(Hay bacillus) *bacillus subtilis*.

x800

the mouths of people working much among hay or in stables—in sheep and other animals.

Slide (21.) *Bacillus* of scarlet fever, a colony.—This is the bacillus Dr. Edington separated out from material taken from patients suffering from this disease, and inoculation with which in the lower animals produces all the symptoms of scarlet fever. The effects of this disease on the mouth and jaws are interesting to us from the frequency with which we have severe inflammatory conditions of the mouth and throat, and partial or total necrosis of the inferior maxilla, especially in young patients.

Slide (22.) Micrococcus of scarlet fever (Klein's scarlet fever organism).

Slide (23.) Anthrax bacillus.—This is a most virulent pathogenic organism, causing death in sheep and cattle in two or three days. All the excretions of affected animals are swarming with the bacillus and are the means of spreading the contagion. In man the disease is called wool sorters' disease, or malignant pustule. Men working among wool or skins sometimes become infected by inhaling the spores from the wool or skins which have been removed from diseased animals. It is equally fatal in the case of man.

Slide (24.) Bacilli and leptothrix. A culture from tartar.

Slide (25.) Sarcina coccus. This organism is arranged in little cubes of multiples of four, and is a pure cultivation from a dirty mouth.

Slides (26, 27, 28.) Pus from pyorrhœa, showing bacilli. Bacillus pure culture from pyorrhœa. Micrococcus of pyorrhœa pure culture. Pyorrhœa still under investigation. Four organisms have been separated from the pus, three micrococci and one bacillus. Bacillus of syphilis. (Lustgarten.)

I have not a slide to show this bacillus; nevertheless, syphilitic conditions, mucous patches, gummata, etc., are sometimes met with in practice, in which cases the greatest care ought to be used to cleanse both our hands and instruments well after operating on such mouths, as it is not the first time that syphilis has been conveyed from one patient to another by means of foul instruments.

The presence in the mouth of such numbers of microbes, many of which are pathogenic, suggests to us the possibility of infection from such organisms after tooth extraction by means of the open wounds, and may account for some of those cases of obscure inflammatory after trouble which we sometimes come across. I make a point of recommending all patients, after the removal of several teeth, to use a powerful antiseptic mouth-wash in view of this. More particularly should this be attended to in the case of debilitated subjects with a tubercular tendency, as the open wounds would form a good medium for the development and growth of tubercle bacilli. Gangrene or the lungs, chronic pyæmia, abscesses of throat and mouth, etc., have by various authors been ascribed to the action of the micro-organisms of the mouth. Dr. Miller mentions that he has been able to produce septicæmia in

rabbits and mice, by injecting into the lung, saliva from the mouth of a perfectly healthy person. This, of course, is due to the organisms micrococci, etc., in the saliva, or to some of their products, ptomaines. To keep the mouth in a thoroughly healthy condition, all roots and teeth that cannot be filled should be removed, as they form sources of infection, and the teeth should be thoroughly brushed with a tooth-powder having antacid and antiseptic properties. Just before going to bed is perhaps the best time to do this, as during sleep the mouth is at rest, and fermentation in active progress, especially between the teeth where food is most likely to lodge. By the diligent use of antiseptics, the silk threads passed between the teeth, the mouth can be kept comparatively free from microbes.

The point to consider now is, which antiseptic is best for our purpose? Mercuric chloride is by many considered the best antiseptic, but for use in the mouth it is both very poisonous and disagreeable, as well as not being very stable. When mercuric chloride especially strong solutions, comes in contact with albumen it unites with the sulphur to form mercuric sulphide, which is perfectly useless as an antiseptic. As for carbolic acid, it has been experimentally proved to be too feeble and insufficient, as it takes one or two days for a 5 per cent. solution of carbolic to destroy the spores of anthrax.

Dry heat is a valuable antiseptic, and is extremely useful in the treatment of teeth with putrid canals when immediate root-filling is carried out.

Dr. Edington has investigated the antiseptic germicidal and bacteriocidal properties of hydronaphthol, one of the coal-tar derivatives. This he has done very thoroughly, with the result that it proves to be the most valuable antiseptic we have. It is soluble in cold water in the proportion of 1 in 1100, which is stronger than 1:1000 mercurio chloride. It is soluble in hot water in the proportion of 1 in 300, and mixes in any proportion with glycerine. It is not poisonous, has a pleasant odour, and can be used full strength, if necessary, without any bad result. I have been using a 10 per cent. solution of hydronaphthol for some little time for the treatment of putrid conditions, etc., and find it better than any antiseptic yet tried. The proprietors are making up, specially for dental purposes, tooth powder containing 5 per cent. of the antiseptic, a mouth wash, a 10 per cent. solution. and cotton wool, specimens of which I hand round for inspection.

DENTAL EDUCATION.*

By E. C. FISK.

Mr. President and Gentlemen,—My object in reading this paper is more with the intention of promoting discussion, than of giving you any fresh information regarding Dental Education, for I certainly think that some alteration is necessary; and I have therefore briefly noted a few points in which I think improvement could be made.

When I was going through my Dental curriculum I could not help comparing the difficulties which a Dental Student has to surmount, and the value he receives in return for his labour and money, with the ordinary lot of a Medical Student.

As you are aware, the first thing after the Preliminary examination the Dental Student has to spend three years in acquiring a knowledge of that which is most important to him in after years, namely—Dental Mechanics. After that two years have to be passed in Medical and Dental schools receiving instruction in anatomy, medicine, surgery, &c., and the special subjects of his own profession. This over, and he has passed his examination and received the diploma from the Royal College of Surgeons, he is launched upon the world to fight his way, much in the same condition as a young girl who has just left a finishing school, and who has been taught French, German, and other ladylike accomplishments, and has a general idea of the rudiments of those subjects, but is unable to ask in any language but her own for the common necessities of life, and whose musical attainments are confined to the "Maiden's Prayer," and such like pieces. I do not mean to say that he knows nothing of his profession, but I am convinced that after the student has obtained his L.D.S., and started in practice, he will soon discover that he has quite as much to learn and still more to unlearn.

While he is at a Dental Hospital he is taught to remove and to fill teeth, but has very few opportunities of seeing the rarer cases, such as fractured jaws, tumours, &c. &c. Therefore in after life should any case present itself outside the usual routine, he has either to consult a general practitioner

* Read before the Students Society at the National Dental Hospital

or send the case to a general hospital; he, knowing little about it, being unfit to treat, besides being a trifle hazy as to the position of vessels, nerves, &c., that would be in his way should an operation become necessary.

The question, therefore, which arises, is—whether this result is the fault of the man or the fault of his teaching. In reply, I assert most emphatically that the teaching is at fault. I will now endeavour to show how impossible it is for the student to acquire a thorough knowledge of his profession in the shortest possible time as laid down by the College. For this purpose I have arranged a few tables shewing how the student is expected to employ his time during the various Sessions.

Imagine a student just entering the schools. By referring to this table you will see that the day commences with the study of the science of physiology. After hearing of the magic rhythm of the heart's beat, the composition of bile, or other matters connected with this science, he has then to trot to the Dental Hospital, where he will be engaged in either filling or removing teeth. The next hour is devoted to the more satisfying and pleasing task of preparing for the more arduous duties of the remainder of the day, by laying in a foundation in the shape of a good meal.

No doubt during his dental work he has forgotten a great deal of the subject matter of his previous lecture. At two o'clock he commences dissecting, but however fascinating the subject may become to him, he must hurry off at three to the Chemical theatre, where his brain is still further bewildered with equations and complex formulæ, such as $C_3H_5\overline{3C^1_8H_{33}O_2}$, which you all know is the formula of olive oil. At four, the scene must again change, and he has now to return to the subject of anatomy, where the complex forms, variations, and relations of the cervical and solar plexuses, Meckel's ganglion, and the contents and boundaries of the Ischio-rectal fossa, or other parts of our delightfully simple human frame, drive from his muddled brain most of that which had been hitherto retained of the aforesaid formulæ.

The student is then allowed an hour's breathing space, after which he must rush off to imbibe from the pleasing eloquence of Mr. Spokes the peculiarities of dentition of the well-known Bony Pike of North America, kangaroos, snakes, and other interesting creatures, which for my own part I often wished were in a place which shall be nameless. This lecture over,

you would think that the student had had enough crowded into his brain for one day, and might now indulge in a little relaxation, but alas! no! he is now destined to endure a lecture on operative dental surgery which may possibly last only an hour, but has been frequently known to extend to two.

The lectures of the day are now ended and the student returns home, and having been advised to devote his spare time to reading, gazes with dismay upon his books, feeling sick at heart at the task before him, and communes with himself as to which subject he shall tackle first. After reading for a length of time which varies according to the aforesaid student's thirst for knowledge, he retires for the night. I was about to say "to rest," but such is not often the case, for his overtaxed brain still endeavours to solve, in dreams, the various problems and difficulties which have been troubling him during the day.

This day's work is but a type of what is going on throughout the dental student's educational career. Can we therefore consider their complaint of being overworked? To this question I think there can only be one answer.

This continual overcramping and overcrowding of such a diversity of subjects into the students head, is continued day after day, and week after week throughout the various sessions.

During the second winter the subjects of Physiology and Chemistry give way to the more difficult General Surgery and Medicine. By referring to the Table you will see that it is well nigh impossible for the man to gain a thorough knowledge of General Surgery, owing to the little time at his disposal for ward and out-patient work. It is equally impossible to learn Surgery from lectures and reading, as it is to acquire the necessary skill for filling teeth without practical teaching.

This, I think, will account for the dislike which the Dental Student has for the surgical part of the examination, and the difficulty which he has in satisfying the examiners in this particular subject.

In the Dental curriculum there are far too many subjects, lectures, and demonstrations to get up, and to attend. Supposing some very energetic students were to attend all the lectures and demonstrations that are in the Course, he would have to sit, in round numbers, about 890 hours; or were he to sit continuously for eight hours per day until the whole of

the lectures &c. were finished, it would take him in all, four months, two weeks and four days to complete the sum total of them all.

Taking into consideration the Dental curriculum and the fees that have to be paid, I would strongly advise that a medical qualification should first be obtained, as it would add to the dentist's social status; and patients would not be so chary in coming to him with the rarer cases. A medical qualification would besides be of great service in practice; the medical men in the neighbourhood would be more likely to send patients to a dentist holding a medical qualification than to a L.D.S. only. It would be to their interest to do so, as otherwise the surgeon practising dentistry would be inclined to go into general practice, and thus render competition keener amongst them. Again there are many other advantages in holding a medical qualification which are obvious. and need only now be slightly entered into.

For instance, patients would have greater confidence, and would not ask the questions which they so often put, such as "Would it not be better for them to consult a doctor as to whether it is safe for them to take gas?" or again:—"Whether you give gas without a doctor being present." Very few patients know anything of an L.D.S. qualification, or the work that has to be done to obtain that qualification, but they all seem to understand the difference between a doctor and a dentist, or such questions would not be asked.

It would be of great service also in obtaining appointments. The difference in fees between the two qualifications is very little. In working for the L.D.S. the student covers most of the ground required for the conjoint Physician and Surgeon. Again from another point of view, namely, as a speculation, it would be advisable, because the extra outlay of money and time would be small, as I will now endeavour to show.

The cost of a Dental education, may be roughly stated at £185, whilst on the other hand that of a Medical is only about £159 10s. The difference in money if you wish to obtain the medical in addition to the dental qualification would be an outlay of only about £50 extra. The following are the various fees required for both qualifications:—

MEDICAL FEES.

Composition Fee	£100	0	0	(by instalments)	110	0	0
Instruments	.	.	.	.	10	0	0

Books	8	0	0
Parts for dissection	3	0	0
Subscriptions	2	0	0
Registration	5	0	0
Examination	31	10	0

Making a total of :—£159 10 0

DENTAL FEES.

Pupil's Premium	£63	0	0
General Hospital	42	0	0
Dental „	25	10	0
„ Instruments	25	0	0
Books	10	0	0
Parts for Dissection	2	0	0
Subscriptions	2	0	0
Registration	5	0	0
Examination	10	10	0

Making a total of :—£185 0 0

This calculation is given in round numbers, the amount of course varies according to the school chosen.

With regard to obtaining a practice the dentist is greatly handicapped. After spending this large sum [and we must also take into consideration the length of time he has devoted to study] he starts in practice, and fondly hopes that patients will flock in numbers to consult him. But how many of the general public know the difference between the L.D.S. and R.D.S.? They will naturally go to a cheap man, and a qualified man cannot afford to work at the low fees the R.D.S. man is satisfied with. How is he to get together a practice? He cannot advertise, and people are afraid to consult him because they fear he is too expensive. In many cases an advertising man has a practice close by, and is also often a sound practical man into the bargain. Of course where the beginner has money and can afford to wait, he can push on, but otherwise his lot is too often a long struggle for many years before he can secure a firm footing.

I certainly think that more protection should be afforded to men holding diplomas, and that our leading societies and

associations should take the necessary steps to let the public know the difference between the Licentiate, and the man who chooses whatever combination of letters he thinks needful to tack on to his name. This applies almost entirely to the suburban and provincial men, and not to the great guns practising in the neighbourhood of Cavendish Square, and other like places.

Now, gentlemen, as you probably gather, my pet theory is that a dentist should take a medical qualification in addition to the dental, but that of course rests entirely with himself. I do not think therefore that the Dental curriculum needs much alteration for men going in for the double. But for those who only purpose taking the L.D.S., I should like to see the subjects of both Medicine and general *Materia Medica* entirely withdrawn from the course ; these subjects being of no service to him whatever in a dental practice.

The knowledge of the special *Materia Medica* that concerns him as a dentist he obtains at a dental school. The time that would be gained by the withdrawal of these subjects could then be devoted to acquiring a better knowledge of that which is most important to him in his after career, namely—practical work. The student is quite aware that he will not be examined in these subjects, and, therefore, does nothing but grumble at the hardship in having to attend the lectures, and in the majority of cases does not make the slightest attempt to acquire a knowledge of either subject.

With regard to appointments held by students in a dental school, I think that there should be two assistant house surgeons and an assistant demonstrator, and in the event of there being a laboratory attached to the school, an assistant demonstrator of that department also. These appointments should be looked upon as prizes, and should be held for a limited time only, say six months, and in every case, as in medical schools, there should be competitive examinations for each appointment. This, I think, would stimulate the men to do good work, and make them more anxious to outtrival one another than is the case at present.

With regard to the examination, I consider it, as at present conducted, simply a farcical one. It is supposed to be practical, but is it so? I certainly do not consider putting in a gold filling, and attempting to diagnose cases which the student has not had in all probability a chance of seeing during the curriculum, and also giving off-hand treatment of a few

regulation cases, a practical examination of a man's capabilities, especially when we take into consideration the amount of work that is crowded into the course.

As the curriculum stands at present, I am of opinion that the examination should consist, in the practical part of operative and mechanical work. The candidate should be requested to remove at least a dozen teeth from the jaws of as many patients; this to be followed by half-a-dozen gas cases. He should then be required to administer gas to several cases, another man performing the extractions. This would tend to show his capabilities both in extraction and gas administration.

The fillings need not necessarily be of gold, as I certainly think that more skill is necessary to make a perfect Osteo, or Jacob's gutta-percha plug, than an average gold filling. We know perfectly well that, provided we shape our cavities correctly, keep them dry, and thoroughly anneal the gold, nothing will prevent its adherence. Of course care must be used in filling with gold as with any other material, but I do not think more than that is necessary, whilst in Osteo fillings speed, as well as skill is demanded.

A few hours should be devoted to mechanical work, which should consist of some of the following items:—Casting plaster, and zinc models with their counter dies, striking plates, fitting teeth, modelling, packing, &c.

I should like to see the examination in two parts, a primary and a final. The student would know something of chemistry if he had to satisfy an examiner in that subject. At present all he thinks of is how few lectures he can scrape through with. As for learning any of the stuff he laughs at the idea. He will tell you that he has quite enough to learn as it is without his getting up matter he is not examined in; yet at the same time he would find a little chemistry very useful to him afterwards.

I would submit that the primary examination should consist of the following—

- I. Chemistry.
- II. Histology and Physiology.
- III. Special Materia Medica.
- IV. Metallurgy.
- V. Osteology

THE FINAL—

- I. General Anatomy.
- II. „ Surgery.
- III. Dental Anatomy.
- IV. „ Surgery.
- V. Practical Work.

The primary examination might take place at the end of the first winter session.

Gentlemen, in conclusion, I can only repeat that my object in reading this paper has not been to give you any fresh information, but simply to open ground for discussion on what I consider a very important question. If I succeed in this I shall feel that I have attained the object aimed at in my paper.

INSTRUMENT TEMPERING.—Dr. Andres takes the crystals of cyanide of potassium and melts them in an iron crucible; heats the instruments in this liquid, and then dips them into a solution of silver, such as is used for silver plating. By doing this he gets an instrument that will stand better than if tempered by any other method.

LOCAL ANÆSTHETICS.—The following are vaunted as reliable anæsthetics—

- R. Cocaine hydrate, 4 per cent. sol..... 3 ounces
 Carbolic acid..... 5 drops
 Chloral hydrate..... 5 grains

Mix. Use hypo-dermically around the tooth.

R. Chloral hydrate, Gum camphor, a.a. q.s. for 1 ounce.
 Rub well in a mortar to liquefaction and add carbolic acid 5 drops. This formula is due to Dr. J. C. Storey, who sends it to the *Southern Dental Journal*—

Apply on a bit of cotton around the tooth to be extracted—

- Gum camphor..... 2 drachms
 Ether Sulph. Conc..... 4 ounces

Mix. Apply round gum with cotton.

Another—Pure alcohol on a piece of cotton put around the tooth.

British Journal of Dental Science.

LONDON, JULY 15th, 1889.

ILLEGAL DENTAL TRAFFICKING.

WE desire to call the careful attention of our readers to the report of a discussion on Article 3 of the Dentists' Act which took place at the Annual Meeting of the Midland Branch of the British Dental Association ; and to read also a letter which appeared in the "Correspondence" of a recent issue signed "Charles Audley." This letter, which betokens acquaintance with certain districts in the north of England, presents to us a most deplorable state of things. It points out numbers of the most flagrant transgressions of the Dentists' Act. It shows that dentists registered by the Medical Council are able to and capable of executing vile frauds in order to escape the mild provisions of the Act. Well may it be asked, how can such things be? There is a powerful Association the objects of whose existence are the maintenance and progress of a high standard of professional ethics, and yet after many years, a letter with such information is received and such instances can be multiplied. The British Dental Association has doubtless done and is doing good work ; it is slowly tracing the footsteps of malefactors and when one is caught and prosecuted the readers of Dental Journals are treated to lengthy and dreary accounts of the trials. This temporising policy of the Association may have been at one time a humane policy ; for it was its object to induce the many to leave their evil ways by making examples of a few cases of undoubted disobedience. It is, however, perfectly clear that a more radical and vigorous

policy should be instituted ; and we trust pressure may be put upon the executive to adopt such a policy unless, as may be the case the Association finds itself wholly unable to grapple with the extensive and wide-spread illegal practice of dentistry in the midland counties and elsewhere. The whole difficulty turns upon that belated clause 37, and Mr. Harding did excellent service in bringing forward his resolution. "That in the opinion of this meeting, the time has fully come when Clause 3 of the Dentists' Act should be placed in abeyance." An amendment was proposed to the effect "that Parliament be petitioned to repeal the 37th Clause of the Dentists' Act." This was lost. In our opinion the practical outcome of the original motion so far as reaching the evil is concerned will be absolutely *nil*, but as a means to stir up the profession from its present apathy it will be of great service. Nothing short of the repeal of this clause will satisfy us, so long as it stands in the Act it is useless to talk of abeyance. With recent experiences of litigation fresh in our minds we feel confident in stating that any number of resolutions in favour of abeyance will not be of the slightest value. When a case comes to be tried in a court of law abeyance of a clause in an Act will tell against us, and this of all things we must avoid. When we strike we must strike home.

DENTAL EDUCATION.—There seems to be a constant tendency amongst a certain section of the profession,—some members rank themselves as advocates of higher education and qualification, to depreciate mechanical education and to curtail the time, which should be devoted to the acquirement of competent knowledge of Mechanical Dentistry. At present it is recognised generally that three years should be devoted to the workroom, but letters have appeared in this and other journals advocating devotion of only two years to mechanical work in order to enable the student to take his higher qualifications in a reasonable time. This appears to us to amount to a want of recognition of the fact that mechanical work is a part, a most important part of our professional life pursuit, and that

to neglect this in order to know Surgery and Medicine better would be a total perversion of dental education. Three years should be the shortest time a dental student should devote to the workroom, and even then, the experience of Metropolitan Teachers is that a large number of the students would be greatly benefitted if compelled to spend another year under a good teacher in a mechanical laboratory. It certainly will be a most deplorable event for the public when, if ever, it arrives the dental student is only called upon to attend the laboratory for two years.

LOCAL ANÆSTHETIC.—Thoroughly dissolve twenty grains of cocaine in one ounce of ether (concentrated), and add one ounce of pure oil of peppermint; shake well before using. After using this preparation for about two years and after having tried almost everything offered to the profession, Dr. Staples finds it gives better satisfaction than anything else. In fact, for extracting teeth and fangs, where the inflammation is so great as to partially loosen them, he finds it almost entirely does away with the pain, when applied from six to twelve minutes.

FILING BLOCK.—Dr. J. B. Vernon uses a door bumper, such as are screwed to the wash-board back of a door to protect the wall, for this purpose, screwing it to the top or front edge of the bench; at the suggestion of Dr. G. A. Bowman, he glued on to the end the half of a rubber ball, one of the small rubber cups suggested by Dr. Bowman in a former issue. This block can be used on the side or top of the bench to suit the convenience of the workman. The advantage of such a block is that it can readily be screwed to the bench and removed if necessary; the rubber covering helps to hold the plate in position, and deadens the noise when filing.

AN ORIGINAL METHOD of making dies for crowns, and also of investing a porcelain crown for soldering.—Dr. C. D.

Snow, of Minneapolis, writing to the *Dental Review* says :—
“In making gold crowns of plaster models of teeth, in the old way, making the die out of the harder metal, and counter out of the softer, the crown is much larger than the plaster model, but if the metals are reversed, making the die out of the solder, the crown is about the same size. In making the die use pure lead, and run Haskell’s Babbit metal over it for the counter. He has also found a quick and good way for investing teeth and crowns for soldering is to take a piece of asbestos paper, wetting it with water, and wrapping it around the tooth or crown to be soldered, and holding it in place with a piece of binding wire. The flame is then turned on to the whole until dry. Sometimes it is well to oil the tooth before putting the paper around it.

• TO REMOVE BROKEN DRILLS FROM NERVE CANALS.—Dr. Truman, according to the *Dental Cosmos*, exhibited a device he had recently used to remove a broken instrument from the pulp canal. The instrument in question, a nerve-drill of the Gates-Glidden pattern, had twisted off, deep down the pulp canal of a superior lateral incisor. He had, in the effort to remove it, enlarged the canal around it, and loosened it so that it could be readily moved from side to side, but he was not, with any instrument at hand, able to seize it for removal. Taking a piece of fine brass wire, such as is used to keep open the needle of a hypodermic syringe, he formed upon one end a spiral of a few turns by winding it upon an instrument about the same size as the broken one and securing the other end to any small tool with gum shellac. This spiral he placed over the broken instrument in the pulp canal, pushing it well down with a broach. Upon gently withdrawing it, the coils of the spiral tightened upon the broken instrument, holding it sufficiently firm to effect its removal. It is suggested that in cases where the broken portion was more firmly impacted, it might be best to place within the spiral, before placing it over the broken instrument in the root, a minute portion of zinc phosphate cement—not sufficient, however, to permit the

cement to come in contact with the walls of the canal ; and after placing it in position allow it to harden before withdrawing it. He said the difficulty in removing a broken instrument from the pulp canal is usually due, not so much to the firmness with which it is held, as to the difficulty of getting any instrument to take hold of it ; especially is this the case with a pulp canal reamer whose cutting portion is larger than the shaft.

FILLING ROOT CANALS.—The following formula is said to be useful :—

R.	Iodol	...	...	...	3j
	Oxide of zinc	...	...	...	3ij
	Cosmoline	...	...	...	q. s.

Make into a stiff paste.

THE VALUE OF A TOOTH.—A Boston dentist has been fined thirty pounds for extracting a wrong tooth. And yet some people grumble at being charged the same price for a whole set of ivories ! It is a hard world.

A TOOTH DROPPED INTO THE TRACHEA.—John Edwards, an Illinois Central engineer, at Galena, Ill., who was supposed to be dying of quick-consumption, in a paroxysm of coughing emitted from his throat a bony substance, which, on examination, proved to be a tooth. A few weeks previously, Edwards underwent the operation of having his upper teeth extracted, preparatory to the introduction to an artificial denture, and during the operation, which was rapidly performed, one of the teeth, without the knowledge of either the patient or operator, dropped down the throat, it is supposed, and lodged in the windpipe, where it caused the irritation which was thought to presage consumption.—We can hardly accept the above account as it stands, for there are usually, if not always, very unequivocal signs when a foreign body enters the trachea ; unless these are present, we can hardly believe that the tooth could have remained in the trachea or bronchi, and give rise to pulmonary abscess.

EXTRACTION MADE PAINLESS.—Drs. Henoque and Fredel, in a communication made to the Biological Society of Paris, state that extraction of a tooth may be rendered painless by spraying the neighbourhood of the external ear with ether. The anæsthesia of the trigeminus so produced extends to the dental nerves, and thus renders the production of general anæsthesia needless. This method undoubtedly answers in some cases, but fails in many, and the cold to the ear to some people is most disagreeable.

DANGERS FROM THE USE OF COCAINE.—Perhaps cautions cannot be too often enforced, so we reproduce the following from an exchange :—

1. Certain persons possess an idiosyncrasy to cocaine which cannot be foreseen or entirely guarded against.

2. Cocaine exerts its toxic effects upon the nervous centres and secondarily, the heart.

3. Its evil effects are most liable to be seen in neurotic subjects.

4. The danger in cocaine-poisoning is mainly from paralysis of the heart, syncope.

5. It may be well to precede its use by the administration of alcohol or other cardiac stimulant, as is done with chloroform.

6. Special care is needed in “weak heart” and organic heart-disease.

7. The subcutaneous administration is dangerous and should be avoided.

8. The use of the stronger solutions is dangerous and unnecessary.

9. The treatment of cocaine-poisoning consists of measures to rouse the heart, especially inhalations of nitrite of amyl.

ADAPTING ARTIFICIAL VELA FOR CASES OF CLEFT PALATE.—Dr. Calvin Case demonstrated before the Chicago Dental Society his method of making and fitting vela. To take the

impression he endeavoured to enforce the fact that absolute perfection was material only along the border of the hard palate cleft, and over the surface of the roof of the mouth that the lateral wings will cover. He makes a mould in plaster from this, forming the model of the palate in modelling composition producing the form of the "veil" by repeated trying in the mouth. Then by the aid of a specially formed flask he surrounded it with parts in plaster which were subsequently duplicated in Babbit-metal. The latter were not more difficult to make than an ordinary die and counter for a metal plate. In polishing the casts preparatory to vulcanizing the artificial palate, he showed how the first palate may be produced with a thin and abridged veil so as to be less irritating to the naturally sensitive tissues, and how subsequent ones could be easily thickened and extended, as the case required, and also in case the palate is found to be imperfect in its proportions, how it can be readily corrected by scraping or renewing the casts. After the palate was vulcanized he took the impression for the sustaining plate.

TO OBVIATE THE UNPLEASANT TASTE OF CORROSIVE SUBLIMATE.—Dr. George Allen in the *International Dental Journal* says—For some time he has been using rose-water as a diluent, and finds it works well. He keeps a one per cent. bichloride solution ready prepared, and mixes it with the rose-water when wanted—generally in the proportion of one part of the former to nine of the latter. Patients notice the change in taste and speak very pleasantly of it.

Abstracts of British & Foreign Journals.

THE DENTAL REVIEW.

SENSITIVENESS OF DENTINE NOT EXPLAINED BY FLUID CONTENTS OF TUBULI.

By LEVITT E. CUSTER, B. S., D.D.S., Dayton, Ohio.

It is assumed that the contents of the tubuli is a liquid which being in the form of a column, and surrounded by unyielding walls, is in such a relation that pressure upon the distal end forces this column of fluid through the tubuli, causing an outflowing at the pulp-end in sufficient quantity to produce pressure and pain. This theory is held, as accounting for the sensitiveness of dentine. Now, to transmit sensation is the property of nerve tissue and protoplasm alone. Therefore, we are restricted to the consideration of a column of fluid surrounded by rigid walls, which column acts mechanically by transmitting vibrations, or by being pushed through the tubuli by the action of the instrument in cutting. This outflowing of the tubular contents into the pulp chamber, and producing pressure, is said to be the cause of pain. The theory is he thinks not tenable, since the surface covered by the instrument, when cutting, is very small; that when cutting there is very little, if any, pressure upon the column of fluid. The instrument cannot enter the tubuli, it only cuts across the end, which can make but little pressure, and only an infinitesimal bulging at the proximal end of the tubuli could occur. If all the liquid contained in the tubuli were to be emptied into the pulp chamber, the pressure, if any, would scarcely be felt on account of the very small amount of room it would occupy. Suppose the tubular contents did flow out enough to make pressure, since blood flows in the direction of the least resistance, and therefore the arterial supply of the pulp would be retarded while the venous exit would be accelerated, and thus the pressure be compensated for, and an equilibrium of pressure maintained. The fallacy of this theory of sensitiveness of dentine is further proven by the fact that pressure alone, by a blunt instrument upon the dentine does not cause pain—it is only when that instrument is drawn across the distal ends of

the tubuli. Also, that when first cutting in the interzonal layer, in that portion where there is the most extensive anastomosis of the tubuli and their contents the pain is most severe where, if the contents are fluid, and pain depends upon pressure, it should be the least, for pressure upon one tubule and contents would more likely be communicated laterally, and produce bulging in a near portion of the cavity rather than overcome all the resistance and friction necessary to reach the pulp and there produce pressure. Another proof of the fallacy of this theory is, that if it is a liquid it cannot be pulled out of the tubuli, much less undergo the process of mounting on a slide for the microscope and yet maintain its identity as such. Who ever saw an unsupported column of a liquid unless it was in motion? Under the microscope the dentinal fibril is seen as an extension of the cell contents of the odontoblast into the tubuli, which, as is well known, is not a liquid at all, but a jelly-like mass of protoplasm. That the tubular contents is not a fluid which acts mechanically in communicating sensation is further proven by the action of obtunding agents. It will be noted here that the strongest proof offered by the adherents of this theory is taken from the effects of obtunding agents, especially by dehydration. Water or moisture is essential to a perfect performance of nerve function as a constituent of the fibril, and if the fibril does not entirely fill the canal at places water undoubtedly fills the interbeaded spaces, where it acts as a condition for preserving an equilibrium of pressure. If this water be thoroughly withdrawn from the fibril itself, and from around the fibril, sensation cannot be conveyed any better than if the tubular contents were a liquid, and that were withdrawn. All tissues containing nerve endings, when deprived of moisture or dried up, cannot receive and communicate nervous sensation of themselves; they can only mechanically transmit vibrations. Owing to the peculiar structure of dentine, dehydration acts as an obtundent upon sensitive dentine more powerfully than upon any soft tissues. The living and sensation-conveying portion of dentine is enclosed in long unyielding walls, composed almost entirely of inert lime salts. The communication with the nutritive supply, and with the internal moisture supply, is long and tortuous. Each tubule and contents seldom send off intercommunicating branches. Each tubule and contents opening into the cavity is in communication with the pulp at the one end and with the air and external agents at the

other. This is the only instance where a thread of living tissue is in contact at one extremity with life and the sources of nutrition, and at the other with external agents. So, from the above condition of things, the extreme length and small diameter of the dentinal fibril and its enclosure in inert calcified walls, it is evident that dehydration by chemical agents, and by heating the calcified walls, can be most thoroughly accomplished before moisture can be drawn from within, and that while the fibril is deprived of its moisture constituent it cannot receive and communicate sensation. So dehydration of the fibrils, which we believe the dentinal canaliculi to contain, is just as powerful an obtundent as if the contents were entirely fluid, and this were evaporated at the distal ends of the tubuli. The only manner in which the free fluid portion of the contents of the tubuli could produce pain would be when it is condensed by the instrument in cutting, if this does condense, by making lateral pressure upon the thread of nerve protoplasm which incompletely fills the tubuli. If the contents of the tubuli is a fluid without albumen, coagulating agents would have no effect as obtundents. Carbolic acid and chloride of zinc would be of no value. Reduction of temperature, if the contents are entirely fluid, would be of no value unless it reached the freezing point.

FACIAL NEURALGIA.

By W. A. STEVENS, M.D., Chicago, Ill.

NEURALGIA is a symptom and not a disease ; it is an indication of a disturbance either near or remote from the situation of pain. The symptoms are various : paroxysmal, which last a few minutes and then cease, to return after a short interval ; periodical occurring at certain hours of the day, and often continuous, without any inflammation or engorgement of the parts where the pain is located. The causes are numerous, viz. :

Exposed nerves,
Sensitive dentine
Roots of teeth,
Pulpless teeth,

Injured tissues surrounding the
nerve trunk,
Malaria or marsh poison,
Alcoholism,

Pregnancy,	Tobacco,
Menstrual irregularities,	Crowning of the teeth,
Exostosis,	Developing wisdom teeth,
Pulp nodules,	Pressure of plate on some nerve
Injured nerves,	trunk. .

In most cases, if not all, the foundation cause of neuralgia is, he thinks, in the blood: during pregnancy the mother's blood becomes loaded with effete matter. As dead teeth and roots are foreign substances in the jaw, this gives rise to much of the trouble they experience in this connection. The same will occur with irregular menstruation, malarial infections, or, in fact, anything which vitiates the blood. Another cause is the rapid decay of the teeth during pregnancy, causing the fluids of the mouth to assume an acid condition, dissolving the lime salts, especially at the margins of the gums, where the fluids of the mouth are mostly held, and teeth where disintegration has already commenced, causing rapid dissolution of tooth substance, until it has inflamed the nerve centres of the teeth. An alkaline condition being the more normal state of the mouth, we have less or no disturbance when the blood presents this condition.

Treatment—Remedies—Destruction of exposed pulps. Sensitive dentine topically. Extraction. Electricity (galvanic, constant, Faradic current) two to five minutes. Treating the peculiar blood taint.

Cases Cited—(Pregnancy.) Malarial. Mrs. A. Pair in left upper central, lateral and cuspid, sound. Extracted by urgent request of her physician. Pain did not cease until after birth of child.

No. 2. Pain commenced about the end of seventh month. Left lower second molar, pulp not exposed. Extracted; pain ceased.

No. 3. Suffered for two weeks with left superior wisdom tooth. Extracted when within two or three weeks of confinement. Pain ceased and the patient completed time of gestation.

1869. N. S. O. Young man about 20; several roots in his mouth, had suffered for years with facial neuralgia. Had received medical treatment and got no relief. Extracted all the roots and diseased teeth. Immediate relief and no recurrence of the neuralgia.

Reports of Societies.

THE MANCHESTER ODONTOLOGICAL SOCIETY.

The last Meeting of this Society for the Session of 1888-9 was held on Tuesday evening, June 5th, at the Grand Hotel, Aytoun Street. Mr. Renshaw, one of the Vice-Presidents, occupied the chair in the absence of Mr. Dreschfeld, the President.

The Secretary, Mr. G. N. Skipp, read a letter from Mr. Dreschfeld expressing deep regret that illness prevented his attendance at the last meeting of the Society during his year of office, and enclosing the following valedictory address, which was read.

VALEDICTORY ADDRESS.

GENTLEMEN,

As the season which closes to-day has been noteworthy for new departures, I shall still add another one to this list, and give a short review of the doings of the Society since the honour of the presidentship was conferred upon me.

We can congratulate ourselves on the fact that our Society's second to none in the kingdom, and from perusing some papers published in the different journals given at other societies, I can safely vouchsafe that it is superior to most. Our papers have all been extremely interesting, illustrating as they have done the different branches of the Dental profession. I need only refer to those on Anæsthetics, to those on points of dental mechanics, and to the paper with demonstrations on the normal or pathological history of teeth. The discussions on these papers have been extensive and varied! and all difference of opinions worked out with the utmost good-will and cordiality, which is a great point in any scientific society. When we look on the advances made by our society from its commencement, and the rapid strides made in the science of our profession, I trust I can confidently see ahead of us, not far distant, the total erasure of that line which, up to the present time, has properly been drawn between surgeons and dentists.

Our annual dinner was successful in every respect, and will, it is to be hoped, always form a red letter day in the annals of our Society. Not unimportant is also the privilege which is

now accorded to us to have our proceedings published in the *British Journal of Dental Science* thus giving greater prominence to our Society.

Before resigning my chair I must briefly refer to the enthusiasm shown by the great bulk of members in this society. This enthusiasm has been amply demonstrated by the capital list of casual communications brought before us, by the interesting cases shown to us, and the exhibition of instruments of every description, either entirely new inventions or improvements upon previously known instruments.

To our indefatigable secretaries too much praise cannot be given ; and they deserve our sincere thanks for their tact, cordiality, desire to please, and the readiness with which they give up valuable time for the benefit of this society. The officers one and all have always been punctual in their attendance, and ever ready to give a helping hand. Sincerely thanking you for the way in which I have been supported in the chair, I conclude by wishing hearty success to the Manchester Odontological Society.

The Chairman then proposed that the best thanks of the Society be presented to the retiring president for his valedictory address ; together with a cordial expression of sympathy and regret that he was unable to attend this meeting by reason of illness. This was carried by applause.

CASUAL COMMUNICATION.

Mr. George G. Campion showed an ingenious articulator, of his own invention, which allowed models to be easily separated, when necessary ; and also allowed a full view of the teeth during articulation.

FINANCIAL STATEMENT.

Dr. Shaw, the Treasurer, then read the financial statement for the year of which the following is a summary.

<i>Dr.</i>		<i>Cr.</i>	
To Balance in hand	£41 2 0	By Expenses	£15 12 8
Subscriptions	30 2 0	Dinner fund	5 0 0
Interest, &c.	0 5 4	Balance in hand	51 3 8
Total	£71 16 4	Total	£71 16 4

ELECTION OF OFFICERS.

The election of the new officers of the Society was then proceeded with, and they are, for the ensuing year, President,

W. Headridge, L.D.S. ; Vice-Presidents, J. H. Molloy, L.D.S., and G. Holt, L.D.S. ; Treasurer, Parsons Shaw, D.D.S., (re-elected) ; Hon. Secretaries, G. N. Skipp, L.D.S., for the Council, and W. Simms, L.D.S., for the Society (re-elected) ; and Members of the Council, H. Planck, L.D.S., G. G. Campion, L.D.S., W. Smithard, L.D.S., (who hold over,) and L. Dreschfeld, L.D.S., J. W. Dunkerley, L.D.S., and J. H. Hughes, L.D.S., elected in place of retiring members.

Upon the conclusion of the election the Chairman said he much regretted that Mr. Dreschfeld was not present to introduce the newly-elected President. That gentleman was one we all knew and esteemed ; and he was sure that the regularity with which he had attended the meetings of the Society was evidence of the manner in which he would discharge the duties of President. He, therefore, had great pleasure in calling upon Mr. Headridge to come forward and take the chair. (Applause.)

The new President, on being installed in his office, said :—

Gentlemen : I cannot conceive what you were thinking about when you made up your minds to place me in this position. I feel very seriously the responsibility you have cast upon me, and am aware of the imperfections which prevent my performing the duties of the office in the manner of those who have gone before me. But the little I can do shall be done willingly ; and I trust you will, one and all, give that help which will allow me to fill the position with credit to myself and the society. (Loud applause.) There is no one who more deplores than I do the indisposition of our late President. He is a gentleman with whom I have had a friendship of many years, and I feel his absence on this occasion very much. I hope he will soon be restored to his usual health and vigour to spend many more happy hours with us again. (Hear, hear.)

Mr. Dunkerley proposed that the best thanks of the Society be given to the retiring officers and to all those gentlemen who had in any way contributed to the great success of the society during the last year.

Mr. Planck, in seconding the resolution, referred in eulogistic terms to the services of the late President.

Mr. G. G. Campion, in supporting the resolution, said it had not been made quite clear whom they were thanking. They were not merely the gentlemen who had retired from office but also those who had been re-elected to the offices they

filled last year ; and, among them, were two to whom special reference was due. There was done one of the most important things during the past year that had been done since the Society was formed. It had been arranged to have the transactions of the Society published, at length, in one of the leading Dental Journals, and to have copies distributed to members. There was the more reason for pleasure in this from the fact that it showed the Dental world there was a society whose members were trying to educate themselves as well as the professional public. He thought their gratitude was mainly due, first, to Mr. Skipp, who was almost entirely instrumental in arranging this matter ; and, secondly, to Dr. Shaw, who had undertaken the very arduous and trying work of editing the transactions. That was a task which required much time and patience ; and he was sure they owed a great deal to both these gentlemen. (Applause.)

The motion of Mr. Dunkerley was carried unanimously.

Mr. Skipp was obliged to Mr. Campion for mentioning his name in connection with the Printing and Publishing Committee, but he must say it had very little to do with him. It was entirely owing to a suggestion from Mr. Dreschfeld that the matter had come to pass ; and it had been Dr. Shaw who had done the work. In his own work as Secretary he had simply travelled in the lines laid down by his predecessor, Mr. Campion, who had arranged everything so well that it had been quite easy to follow him. He had a good deal to do with Mr. Dreschfeld during the past year, and never met a more impartial or kinder hearted man in his life.

Dr. Shaw thanked the gentlemen who had so kindly referred to him ; and, on behalf of the officers, also thanked the Society for the vote just passed. Anything he did for the Society was to him a labour of love. Its success had surpassed his wildest hopes, and he had never dreamed it would rise, in so short a time to its present high position.

VACANCY.

National Dental Hospital, Great Portland Street, W.—
The post of House Surgeon is vacant. Applications to be made on or before 6th August to the Secretary.

Hospital Reports.

MONTHLY STATEMENT of operations performed at the Dental Hospital of London, Leicester Square, from June 1st to June 31st, 1889 :—

Extractions	Adults	874
	Children under 14	426
	Under Gas	1001
Stoppings	Gold	307
	Plastic.	1039
Advice		161
Irregularities of the Teeth		60
Scaling, Pivots, and Dressings		221
Total		4089

J. P. SMITH, T. E. CONSTANT, A. H. SMITH,	}	<i>House Surgeons.</i>
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Work done at the Victoria Dental Hospital of Manchester during the month of June 1889 :—

Number of Patients attended		842
Extractions	Children under 14	} 553
	Adults	
	Under Nitrous Oxide	
Gold Stoppings		76
Other Stoppings		123
Miscellaneous		245
Total		1103

P. A. LINNELL, *House Surgeon.*

Work done at the Birmingham Dental Hospital, 73, Newhall Street, during the month of May 1889 :—

Males	148
Females	214
Children under ten years of age	161
Extractions	531
Gold Fillings	30
Other Fillings	125
Miscellaneous and Advice	105
Under Anæsthetics	43
1357	

FRED. R. HOWARD, *House Surgeon.*

British Journal of Dental Science.

No. 517. LONDON, AUGUST 1st, 1889. VOL. XXXII.

ON SOME RELATIONS OF THE FIFTH CRANIAL NERVE.*

By DAVID FERRIER, M.D., F.R.S.

GENTLEMEN,—When your President asked me to address you on some subject connected with Odontology, my first impulse was to decline, on the ground that I was altogether incompetent to discourse to you on any subject connected with your specialty. But when he assured me that Odontology included not only teeth, but also everything connected with the oral cavity, I thought that I might venture on some communication which might fairly be included within this comprehensive definition. I have chosen as the subject of my remarks “Some of the Relations of the Fifth Nerve,” and have done so, not only because the fifth nerve is the nerve of all others with which you have to deal, so far as your work has a neurological aspect, but also as I should like to bring before you some recent observations, both of my own and others, tending to throw new light on the physiology and pathology of this nerve.

The fifth cranial nerve has been, since the time of Sir Charles Bell, regarded as homologous with a typical spinal nerve—the anterior root being formed by the portio minor or motor division, the posterior root being formed by the portio major, with its Gasserian ganglion homologous with those of the posterior roots of the spinal nerves. And indeed it was by the effects of section of these two roots respectively, that Sir Charles Bell first demonstrated the accuracy of his views regarding nerves of motion and nerves of sensation.

But we have recently learnt more particularly by the researches of Gaskell, that the assimilation of the fifth nerve to the type of a spinal nerve with its anterior and posterior root is erroneous when viewed from the standpoint of homology.

*A paper read before the Odontological Society of Great Britain.

And indeed the whole of the current conceptions which we have been taught concerning the constitution of the spinal nerves and their relations to the sympathetic system require to be considerably modified. We have been taught to regard the anterior roots as nerves of motion, and the posterior roots as nerves of sensation, and the sympathetic chain of nerves and ganglia as a system more or less independent of the cerebro-spinal nerves. But Gaskell has shown us that the spinal nerves consist of two distinct systems differing in their origin, their size, their mode of distribution, and their functional relationships. The one division forms the *somatic* system of nerves which supplies structures derived from the epiblast, and from that part of the mesoblast which forms the mesoblastic somites, or, in general, the muscles and structures of animal life. These somatic nerves consist of an efferent or anterior root derived from the anterior horn of the spinal cord, and distributed to the skeletal muscles; and a posterior, or ganglionated, root which is distributed to sensory organs. The other division forms the *splanchnic* system of nerves, which supplies structures derived from the hypoblast, or, in general, the muscles and structures of organic life; or in other words the muscles of the visceral skeleton and the walls of the blood-vessels and hollow viscera. These last are distinguished from those of the muscles of animal life by the smallness of their calibre, varying in size from 1.8μ to 3.6μ . The splanchnic system, like the somatic, is also composed of different fibres. The former, that is the afferent, are ganglionated like the corresponding roots of the somatic system. Of the efferent, some pass direct to the muscles of the visceral skeleton, and these include the muscles of the face, jaws, and others included by Sir Charles Bell in his respiratory system. The others (the visceral nerves proper) pass at some part of their course into ganglia before they reach their final destination. The ganglia of the efferent system of splanchnic nerves constitute what we have been accustomed to call the ganglia of the sympathetic system. These are variously situated, some near the origins of the nerves, and others at a varying distance nearer or further from the periphery.

These ganglia are essentially vagrant in their character, and thus differ from those of the posterior roots, which are always situated close to the emergence of these roots from the spinal cord.

The differentiation of the spinal nerves into somatic and

splanchnic divisions, and the relation of the latter to vagrant peripheral ganglia, throw a new light on the functions of certain cranial nerves respecting which there has been hitherto considerable diversity of opinion. When we look at the cranial nerves proper we find that the third, fourth, portio minor of the fifth, sixth, and seventh nerves, which are now purely motor in function, were at one time complete segmental nerves, that is to say, they were composed both of an efferent and afferent root. But in process of evolution the afferent root, with its ganglion, has undergone degeneration, though, as Gaskell has clearly shown, the remnants of the ganglion are still capable of being demonstrated at the point of emergence of these various nerves respectively. Hence the portio minor, or motor division of the fifth nerve, is not homologously the anterior root, of which the portio major with its Gasserian ganglion is the sensory, but is a fully formed segmental nerve, of which the sensory division has undergone complete degeneration. The sensory divisions of these various nerves, viz., third, fourth, fifth, sixth, seventh, have been replaced by the sensory branches of the fifth nerve. The motor divisions of the fifth and the facial or seventh are essentially splanchnic efferent nerves, for the striated muscles which they supply, namely those of mastication and expression, all belong to the visceral group of muscles. In the facial nerve there are large and small fibres, the larger fibres being the nerves of the facial muscles, while the fine fibres which come from the *nervus intermedius*, or nerve of Wrisberg, enter the geniculate ganglion, and from thence pass into the greater and lesser superficial petrosal and the chorda tympani. It would thus appear that the nerve of Wrisberg, and its branches *viâ* the geniculate ganglion, constitute a splanchnic nerve probably wholly efferent in function.

I will return to this point when speaking of the supposed relations of the chorda tympani to the sense of taste. Meanwhile let us direct our attention to the nerves of the medulla oblongata. The hypoglossal, or twelfth cranial nerve, is the only somatic efferent nerve; all the others, viz., the glossopharyngeal, vagus, and spinal accessory, are essentially splanchnic nerves, afferent and efferent.

The glossopharyngeal and vagus innervate the alimentary canal and viscera, from the pharynx as far as the hind gut and its appendages.

The somatic afferent branches of the nerves of the medulla

oblongata, with all their complicated visceral relations are contained in the sensory division of the fifth, which arises in close relation with the posterior horn as far down as the middle of the cervical region.

These morphological data seemed to me to have an important bearing *inter alia* upon the pathology of what are termed sympathetic or reflex neuralgias of the fifth nerve. Thus it is well known that visceral irritation, unless reaching a high pitch of intensity, is obscure and non-localisable, whereas it is apt to project itself and become expressed in some somatic region, the central origin of whose nerves is in close relation with those of the viscera in question.

This is a sympathetic or reflex neuralgia; and from the central relations of the fifth nerve to those of the viscera, we may explain the headaches, toothaches, and other neuralgias of the fifth which are known to arise in connection with various forms of visceral disturbance. What should direct the incident upon one branch of the fifth nerve rather than another, under such conditions, is perhaps not quite clear, but I think we may assume that if there are any causes of irritation already existing in any region supplied by the fifth, such for instance as a carious tooth, exposure to cold, &c., these will cause a predisposition to the localization and expression of visceral irritation in this particular part. Thus an irritable tooth may at any time become the seat of intense pain under conditions of visceral derangement; and a similar explanation is applicable to headaches, and other forms of trigeminal pain apt to occur under like circumstances. The locality of trigeminal pain is by no means always an index of its local origin. For as stomachic derangement may be the cause of frontal headache while the stomach itself is free from pain, so a general neuralgia of the fifth may have its origin in some branch of the nerve itself, such as a dental branch which is not itself the seat of conscious sufferings. Instances of this must be familiar to you all; they are certainly in accordance with my own experience.

Among some of the relations of the trigeminal nerve on which I desire to make a few remarks this evening, I would first allude to the supposed relation of the fifth to the muscles of the palate. It has been assumed by some that motor fibres from the fifth supply certain muscles of the palate, viz., the levator palati and azygos uvulæ. It is, however, more generally believed that the motor nerves of the palate are not in-

herent in the fifth nerve, but are derived from the seventh or facial nerve through the greater and lesser superficial patrosal nerves, by way of Meckel's, and the otic ganglion respectively. These muscles, it is said, are apt to become paralysed by lesions of the facial at, or above, the geniculate ganglion; and in fact it has been laid down in important text-books as a canon of diagnosis that facial paralysis, accompanied by paralysis of the soft palate, indicates a lesion of the seventh nerve in the position above-mentioned. We have, however, good grounds for believing that these views are entirely without foundation, and that paralysis of the palate never occurs from an uncomplicated lesion of the fifth, or of the seventh nerve in any part of its course. I have related a case of complete paralysis of the fifth nerve (*Lancet*, January 7th, 1888) in which the palate on the paralysed side was altogether unaffected. The motor innervation of the palate by the facial nerve was many years ago questioned by Hughlings Jackson (London Hospital Reports, Vol. I, page 336, 1864) on clinical grounds, and I have myself never seen any indication of paralysis of the palate in the numerous cases of facial paralysis which I have examined in this relation. The experiments of Vulpian (*Comptes Rendus*, CIII, 1886) upon dogs, as well as those of Beevor and Horsley on monkeys (Proceedings of the Royal Society, No. 278, 1888), have shown that no movements of the soft palate can be excited by stimulation of either the fifth or seventh nerves within the skull, whereas movements of the soft palate are readily excited by stimulation of the spinal accessory or accessorio-vagus. These experiments confirm similar results obtained by Volckman and Hein (*Müller's Archiv*, 1840, and *ibid.*, 1844), which seem to have been ignored by most clinical writers and observers. We may therefore take it as established beyond all doubt that the spinal accessory, and not the fifth or seventh, is the motor nerve of the palate. Paralysis of the palate is apt to be associated with paralysis of the vocal cord on the same side, owing to the community of innervation, and this condition is not unfrequently associated with paralysis of the fifth, as well as some others of the cranial nerves. In the following case, paralysis of the left side of the palate and the left vocal cord were associated with paralysis of the sensory and motor divisions of the fifth nerve, and, at a later date, by paralysis of the facial and sixth on the same side:—

David R., aged thirty-three, admitted under my care into

King's College Hospital, March 29th, 1888. Previous history was unimportant. There was no clear evidence of specific disease.

In June, 1887, patient first noticed that hearing was becoming deficient in the left ear, and soon after he began to experience a buzzing sound in this ear. Then he began to have dull aching pain in the lower jaw on the left side, ceasing abruptly at the symphysis menti; the pain soon extended into the malar and occipital regions on the same side of the head. Thinking that this was due to a carious tooth, he had it extracted, but with no relief to the pain. Shortly after, he noticed that he had lost sensation over the left half of the face, and he then began to have pain in his left eyeball, which felt as if it were being compressed. In January, 1888, he had some swelling and tenderness on the left side of the neck below the mastoid process, probably glandular. About this time hoarseness of the voice came on, which had been gradually increasing, together with the deafness.

Present condition :—Slight dropping of the left eyelid; left pupil smaller than the right; a marked depression on the left temporal fossa owing to atrophy of the temporal muscle, and a similar condition of the masseter and mylohyoid muscle on the same side. On opening the mouth the jaw deviated to the left side (owing to paralysis of the left external pterygoid). The muscles of mastication had entirely lost their faradic excitability. The tongue, when protruded, deviated slightly to the left side; this side of the tongue appeared somewhat puckered or scarred. There was considerable wasting of the left sterno-mastoid, and of the anterior border of the trapezius as compared with the right; and it was observed, at a later date, that there was paralysis of the left side of the palate, and complete paralysis of the left vocal cord. Hearing was defective in the left ear, but an examination by Dr. Pritchard showed that the auditory nerve was unaffected, and that the deafness was due to subacute local inflammation of the tympanic wall in the region of the ossicles. There was almost total anæsthesia and analgesia in the region of distribution of the infra-orbital and mental branches of the fifth nerve, also in the anterior two-thirds of the tongue, and of the mucous membrane of the inside of the mouth as far back as the arch of the palate. Sensibility was normal in the conjunctivæ, and in the region of distribution of the superior division of the fifth. There was total abolition of taste on the anterior two

thirds of the tongue on the left side. His taste was impaired on the posterior third. Two months subsequently (June 1st) paralysis set in on the left side of the face, which in course of a few days became very marked, implicating all the muscles supplied by the seventh. With this there also occurred paralysis of the left external rectus. The patient left the hospital at this time, and I have not been able to trace his subsequent progress.

The association of paralysis of the palate with paralysis of the fifth in this case might have been taken as a proof of the relation of the fifth nerve to the palate, but the affection of the left vocal cord, and of the left sterno-mastoid and trapezius muscles, at once indicated implication of the spinal accessory. This case shows, among other things, that paralysis of the fifth nerve completely abolishes tactile and gustatory sensibility on the anterior two-thirds of the tongue. Some cases have been recorded in which taste does not appear to have been affected in connection with disease of the fifth nerve, but these must be without doubt set down, if correctly observed, as instances of only partial lesion; and, on the other hand, some cases have been reported in which, with lesions apparently confined to the fifth nerve, taste has been abolished not only in the anterior two-thirds, but also in the posterior third of the tongue. The exact explanation of these cases is somewhat doubtful, but the probability is that they are not uncomplicated cases of lesion of the fifth nerve as such.

In the case which I have already reported (*Lancet*, January 7th, 1888), and alluded to above, complete uncomplicated paralysis of the fifth nerve, taste was completely abolished in the anterior two-thirds of the tongue, but retained in the posterior third in the region of distribution of the glosso-pharyngeal, also in the following case which came under my care some time ago (February 1st, 1884) at the Hospital for Epileptic and Paralysed, Queen's Square, the same facts are demonstrated.

Joseph M., aged thirty-three, exhibited symptoms of complete paralysis of the left fifth nerve, both sensory and motor divisions. There was atrophy and loss of faradic contractility of the temporal and masseter muscles. There was entire loss of sensation all over the left side of the face, conjunctiva, mucous membrane of the mouth, and the anterior two-thirds of the tongue. The tip of the tongue was, however, sensitive on both sides, and also the posterior third of

the tongue. There was loss of taste for sweet, bitter, &c., on the anterior two-thirds of the left side, with retention of taste on the posterior third. Galvanic taste was also abolished on the left anterior two-thirds, and retained at the back.

(To be Continued).

WHAT FILLING SHALL WE USE ?

By J. E. CUMMINGS, D.D.S., M.D.S., Syracuse, N.Y.

THIS question is one which comes to us very forcibly at times. There are periods when we are tried to our utmost, in the proper care of our patients' teeth, and if we follow the dictates of conscience, we often times are not in accord with our patients' wishes, but sooner or later they usually agree with us by noting the result. This paper is neither to favour the "old," nor "the new departure," but rather seeks for the proper preservation of the teeth. There are probably a great many operators, who advocate the "new departure" simply because they cannot fulfil the requirements of high class gold filling. I consider we should improve every opportunity of performing difficult work as each victory strengthens us for a more difficult case, and each successfully performed pays for our attempt in the satisfaction it gives. There are a few practitioners who use plastic fillings almost exclusively, and if a tooth is to be filled with gold it must be a cavity easy of access, or one that is sure of success. There was a time, when the writer was attending his course at a dental college, that amalgam was not allowed to be used, as it was supposed to get students in to ways of carelessness and becoming slovenly operators. Tin foil was used instead as it gave the student the same practice as gold; but times have changed regardless of result and amalgam seems now to be used. Amalgam can be, and is used, to great advantage, but at college, where students only stay for a short time, there is a tendency to form careless habits in neglecting to do the work thoroughly, although a great many good operations are performed with this material and some of our poorer patients are now blessed with organs of mastication who would otherwise be toothless. There are a few important questions to be considered before beginning to work on the teeth, to do the best under the circumstances, such as, What is the true structure? Hard, medium or

soft? Will gold be the best filling? Are the cavities too large for contour work to be practical? Are the shapes of the teeth favourable or unfavourable to decay? Have they the proper space to be well cleansed? What is the occlusion of the teeth? Will they receive the proper care from the patient? Some may say that that depends on the dentist giving the proper advice, but this does not hold true in many cases; for if you have the opportunity to examine the teeth after a few months, you may probably find them covered with a soft substance or in some cases with tartar, and plenty of food fragments &c. between. We can only repeat our advice with more earnestness. Last but not least, remember the patient's purse.

There are numerous other points not to be over-looked, but these I consider of most importance for the best results. Perhaps a case in practice would not be amiss to make a point plain.

Miss Nellie W. age 20, in Aug. 1884 had her teeth examined, showing seven cavities. Four were filled with gold, two with amalgam, and one with gutta-percha. She was strongly advised to attend closely to cleansing her teeth and have them examined every six months. She did not however return until Dec. 1888, when all the fillings were in good order, but fourteen fresh cavities had developed, the sad result of such neglect, and some in such a condition that even but faint hope of their being restored to usefulness seemed possible, in fact one had to be capped with a gold crown (or shell). As this is a class of patients we often have to attend, what are we to do?

After deciding upon the material to be used, there are four cardinal points to be observed, no matter what that material may be.

- 1st. Greatest care in the preparation of cavities.
- 2nd. Perfect dryness to be maintained throughout the operation.
- 3rd. The proper introduction of the material, and
- 4th. The careful finishing of the filling.

As to the first point, the success greatly depends on the preparation of cavities, to see that all soft material is removed giving special care to the deep under cuts. That all decalcified and frail tooth substance be removed at the cervical borders as this is where nine out of ten failures begin. Have all the edges perfect and strong and remove all overhanging

walls, that are liable to be weak points and break in the course of a few months.

The second point is of no less importance and may be accomplished either by the use of the rubber dam, napkin, bibulous paper &c. never neglecting the use of warm air after the application of a proper germicide.

The third point is of as much importance for plastic fillings, and the seeing that each and every point of the cavity is properly filled, and no pit holes are allowed to cause failure in the future. The cervical wall can be safely protected from decay, in the use of amalgam or cement, by first applying a layer of gutta-percha the thickness of blotting paper at that point and allowing the gutta percha to run up as far as is thought advisable. This layer should first be gently warmed and moistened with chloroform, and applied to the surface, that has been previously dried by the hot air syringe, insuring perfect contact of the gutta-percha with the dentine. This layer can be very easily finished off after the other material has hardened by passing a few threads of cotton saturated with chloroform, several times between the teeth, which will remove all further edges of gutta-percha. This plan will be found especially successful where cavities extend under the gum, (there need be no fear of the gutta-percha being displaced by pressure from the filling, as it being small in proportion to the cavity, and the filling receiving support from other parts of the walls of the cavity) and the cervical wall will thus be protected and one great point in failure overcome.

The fourth point is the last chance we have to exercise our skill before dismissing our patient, and one on which much of the durability of the filling depends, equally by the shaping of fillings to proper contour, the removal of waste material from between the teeth and the perfect polishing of the fillings themselves and with everything in the way of instruments, discs, tapes, powders &c. at our command, there seems to be no excuse whatever for improperly finished work.

The dental matrix will be found of great benefit in the use of amalgam, cement, and gutta-percha as well as gold, keeping a special set for this class of work. The matrix avoids much surplus of material being used, which reduces the time in filling, facilitates the finishing of work, to say nothing of the lessening of pain, and weariness to our patients.

In the manipulation of gold care cannot be too great in start-

ing the fillings, keeping an ever watchful eye on the cervical border and the points of cavity that are the most difficult of the access. Start by using a few pieces of soft gold that will form a layer, or cushion for the cervical portion of the cavity to protect this most delicate point. At all times avoid the use of any harsh gold, which has a tendency to roll and form a poor foundation upon which to build an extensive piece of contour work, also avoid over working of gold by too much malleting. This layer of soft gold, when well condensed into place, forms a great protection both in preventing caries, and the fracture of the weak walls.

After seeing these pitfalls all well cared for, one can then proceed step by step, using hand pressure that what progress is being made may be seen. Reaching the point when the cavity is full and the matrix, if used, removed, the much neglected hand burnisher can be used to good advantage, insuring perfect adaptibility at all edges while the gold, so to speak, is yet in a semi-soft condition. The sand-paper discs can do good service, starting with grade $\frac{1}{2}$ followed by 0 and 00 and so on down to discs of crocus cloth &c. insuring perfect edges, that will in no way favour the lodgment of food fragments.

The subject of amalgams, as of old, is receiving a vast amount of attention at the present time. That they must be used, to a certain extent, in our daily practice, all must agree, to accomplish the most good in certain cases of extensive caries. There seems to be no question, that amalgam fillings, when thorough care is given, act as great tooth savers and will carry some such weak teeth through a number of years of useful service, and at the same time reduce the expenses within the reach of all. In amalgam we find a more permanent filling than any of the other plastics—it seems to surpass tin, which is one of our best tooth preservers. Although I will not venture into any discussion of this metal now, as it seems to have had its day, and is seldom used without being in combination with gold foil, it requires the same amount of wall strength as gold, also the same time for manipulation, and as for freedom from oxidation it has no claim over amalgam. Whenever amalgam is used if the patient can call for a second sitting, to finish the filling by polishing, it will be found that the tendency to discolour will be greatly lessened and a perfectly smooth surface can be produced that can be easily cared for, in the future by the patient. The cements

are frequently valuable in teeth that are too frail to be filled with gold. Often coming to our rescue to carry them on where everything else fails, and for any of the anterior teeth that are badly decayed and broken, cement is apparently the only filling suitable, being less conspicuous than gold or gutta-percha, and amalgam being entirely out of the question.

But with all due care the life of any cement filling is short, it can only be called a temporary stopping at the best. It is of great service for foundations in some of the large crown cavities where it is entirely protected from moisture. It is also useful by making a gold facing, which would give it the appearance of a gold filling, thus :—after the cavity is properly prepared a piece of gold plate, 30 standard gauge is accurately fitted and two or more platinum pins, as found in artificial teeth, soldered on the inner surface to hold the facing in place, the cement inserted into the cavity, also a small amount around the pins to insure perfect adaptation, and then gently but firmly pressed into place, and the cement allowed to harden, before finishing, which should be the same as for gold fillings with discs, tapes, &c.

This kind of filling can also be performed with gutta-percha instead of cement. I now come to gutta-percha, which is acknowledged to be a tooth saver, although it has its drawback. It certainly will not stand the wear of mastication, it is also stated that it will contract, or draw away from the edges, and when used in large fillings, has a tendency to expand on the surface after being in use for a year or two, this expansion although not detrimental to its properties of preservation, is very unsightly, taking a brown colour, which is about as objectionable as decay in its worst form.

This filling seems most suitable for labial and buccal cavities, where it is entirely protected from the wear of mastication, and has probably more real value in this class of fillings than either gold, amalgam, or cement. In manipulating gutta-percha, care should be taken, remembering that the less amount of heat that can be used to work it the better will be the result in every case. Heat gradually to avoid what Dr. Flagg calls "heat-rot." This filling resists the action of the fluids of the mouth, and takes no part in the formation of acids, and is found at all times a perfect non-conductor of heat and cold, and a low conductor of electricity, and it thus fills a place in the protection of the dental pulp, that can hardly

be claimed by any of the metal fillings. It is frequently of service in flooring sensitive cavities, but for complete exposure of the nerve it could hardly be used, as it is liable to expand, and if covered by cement or amalgam presses on the pulp, causing irritation, inflammation, and possibly death of that organ. For extremely sensitive cavities it is useful as a temporary filling for carrying the tooth along until it can be filled permanently with less pain to the patient. It is generally classed with temporary fillings, but there are places where it seems to fill just the want, and no other material can supplant it. Cavities that are high up, or even under the gum, as between the molars and bicuspidis that are not large enough to require their being opened to the masticating surface, are the situations best suited for this material.

IMPACTION OF FOREIGN BODIES IN THE LARYNX.

THE occurrence of impending asphyxia in connection with the displacement of small plates or the dropping of teeth into the air passages during extraction is a subject of primary importance to dentists. Perhaps no surgical emergency touches them more nearly than these ; there is no time for reflection and yet a false step or a hesitancy in treatment will lead to the most disastrous consequences. The following cases which were under the treatment of Mr. Pickering Pick in St. George's Hospital.* illustrate some of the points of interest in connection with such cases :—

CASE OF FOREIGN BODY IMPACTED IN THE VENTRICLE OF THE LARYNX ; REMOVED BY TRACHEOTOMY ; RECOVERY.

THE presence of a foreign body in the air-passages always causes much anxiety to the medical attendant and few things give so much gratification as the successful result of attempts to remove them. They may be arrested in the larynx, impacted in the superior aperture or in the rima glottidis, in the cavity, not completely blocking it, in the lower part, or in one of the ventricles, and the symptoms to which they give rise will vary with the size and nature of the body and with its position. It would appear that the symptoms produced when

* Lancet Feb. 2 1889

the body lodges in one of the ventricles of the larynx are less severe, and that the danger to life is less when a foreign body is situated there than when it is in the other positions named. Mr. Durham mentions three cases.¹ In one, the trachea was opened six weeks after the passage of a button-mould into the larynx, and this was dislodged from one of the ventricles, after division of the cricoid cartilage. In a second case, a cherry-stone was lodged in one of the ventricles of the larynx for two years before the patient died ; operation was refused, and local disease developed, proving fatal. In a third, a piece of gold remained *in situ* for years without troublesome symptoms. Mr. West² recorded a case in which a shilling was fixed in the larynx for over three months ; it produced loss of voice, but no coughing. Parker³ brought forward two cases of foreign body in the air-passages, in one of which a piece of egg-shell was found adhering to the side of the larynx. This case proved fatal after operation. A curious case is related by Dr. Newman.⁴ A splinter of a rifle bullet penetrated the larynx and remained fixed, with the free margin projecting into the ventricle. This was removed through the mouth a fortnight after lodgment by means of endo-laryngeal forceps. In the discussion on the subject of foreign bodies in the larynx, Mr. Holmes⁵ related a case in which he had performed thyrotomy for the removal of a rabbit-bone which had been lodged for seven days. Mr. Durham referred to a case in which he had found it necessary to perform thyrotomy for a cherry-stone impacted in the larynx. It was found in the middle of the passage, covered by the false cords, whilst the true cords were inflamed and swollen beneath it. Tracheotomy had proved insufficient, as the foreign body could not be dislodged from the opening made in the trachea. Pain is usually a prominent symptom where a foreign body remains in the larynx and has not proved immediately fatal. When in the ventricle of the larynx, it cannot always be readily seen by means of the laryngoscope, and in the case which Mr. Pick records it was not possible to see the ear-ring. If the foreign body can be seen, then it is sometimes possible to remove it by means of the laryngeal forceps through the mouth,

¹ Holmes' System of Surgery, vol. i., p. 760. Pelletan, Desault Watson (vol. ii., p. 261, fifth edition).

² The Lancet, vol. ii. 1877, p. 722, ³ Ibid., vol. i. 1885, p. 151.

⁴ Glasgow Medical Journal, 1887, p. 373.

⁵ The Lancet, vol. i. 1882. p. 912.

and many cases are on record of this method of removal, few more striking than that in which Cameron drew out a penny which had been impacted in the larynx for six years; but when a foreign body is impacted in the ventricle it cannot generally be moved. Needles and pins had been removed after some time had elapsed by this method.⁷ Sometimes it has been necessary to perform thyrotomy, and Mr. Holmes, in recording his case, makes an excellent summary of the treatment &c. of foreign bodies in the larynx.⁸ Dr. Gee records a case, in which a small hook caught on one of the cords, and was only removed by incision of the margin of the cord after tracheotomy; this patient unfortunately died. Mr. Hodgkinson¹⁰ records a case in which a wheat-ear was removed after impaction in the mucous membrane of the larynx. There are many other cases of interest—such as those of Croft¹¹ (walnut-shell), Pemberton¹² (buckle), and Mackenzie,¹² to which we can only refer. Weist's statistics of foreign bodies in the air-passages, although they include 1000 examples, may be misleading, and we have not space to enumerate them. Hering also in 1885 brought forward interesting cases. We may also direct attention to the letter of Mr. Padley in our last issue, in which he recalls the method of inversion and succussion in casualties of this kind—a method which has received the approval of Dr. Geo. Johnson, as expressed in his ‘Lectures and Essays.’

Rose S—, aged eight, was brought to the hospital on Dec. 8th, 1888, with the history that she had swallowed an ear-ring on the morning of that day. No further history can be obtained. It appears that the mother had gone out to work in the morning and had left the child alone, and that she was recalled by a neighbour who informed her that the girl had come to her and complained of having swallowed the ear-ring. The child could not be induced to give any minute particulars. She presented no marked symptoms and breathed without difficulty. She had, however, an anxious and frightened expression, and her voice was hoarse and croupy. There

6 Ranking's Abstract, vol. ii. 1870, p. 234.

7 Semon, The Lancet, vol. i. 1883, p. 685. (After thirteen months.)

8 The Lancet, vol. i. 1882, p. 912.

9 Ibid., vol. ii. 1871, p. 468.

10 Ibid., vol. ii. 1885, p. 155.

11 Ibid., vol. ii. 1880, p. 536.

12 Ibid., vol. i. 1884, p. 927. Medical Times and Gazette, vol. ii. 1866, p. 628.

was nothing to be seen in the throat and no redness about the fauces. Her temperature was 97° . The child was admitted into the hospital in order that she might be watched, as it was thought that the croupy voice from which she suffered, and which was practically the only symptom of the foreign body being in the air-passages, might be due to excessive crying.

On Dec. 10th (two days after admission) the condition of the child was unchanged, and the voice was still hoarse and croupy. The temperature, which had remained subnormal (97°) since her admission, had on the morning of this day risen to 98.6° . She did not complain of any pain, but still persisted in the statement that she had swallowed the ear-ring. She had a distinctly croupy cough. There was no disease to be seen about the tonsils or palate. The lungs expanded equally, and no difference existed between the respiratory sounds on the two sides of the chest. There was a distinct musical murmur over the trachea, heard loudest in the episternal notch. The child was very irritable during examination. She was placed under the influence of chloroform, and the pharynx and fauces carefully examined with the finger, but no foreign body could be felt. An attempt was made to obtain a view of the larynx with the laryngoscope, but it was found impossible to do so. There was no difficulty in swallowing.

On the following day the child was again placed under the influence of an anaesthetic, and the trachea opened above the isthmus of the thyroid body. On passing a probe up through the wound into the larynx, a foreign body was at once felt. An attempt was first made to dislodge it from its position, but it was so firmly fixed in the left ventricle of the larynx that this could not be done. The cricoid cartilage was therefore divided in the middle line, and the foreign body was then easily seized with a pair of dressing forceps introduced through the wound and withdrawn. It proved to be a small, flat, brass ear-ring, shaped like a leaf, and about half an inch in its longest diameter. A silver tube was inserted into the trachea, and the wound above closed. Next day the child was found to be quiet, and had been sleeping almost continually since the operation. The tube was removed. The wound soon closed, and an uninterrupted recovery resulted.

Remarks by Mr. Pick.—This case seems to me to be worthy of being placed on record on account of the absence of those severe and characteristic symptoms which usually

attend the introduction of a foreign body into the air-passages. When the child was admitted there were literally no symptoms, except the hoarse and croupy voice, which might easily have been caused by a prolonged fit of screaming. Owing to the fact that the child was alone when the foreign body passed into the larynx, there was no history of the sudden symptoms of intense suffocation, with dyspnoea, which usually follow immediately upon the introduction of a foreign body. It was evident, however, from the look of anxiety on the child's face that it had been very much frightened, more than it was likely to have been by the foreign body passing down the gullet. The diagnosis was principally established by the two signs of the alteration in the voice sounds and the subnormal temperature. The child was in a condition of perfect health when the mother left her in the morning, and suddenly her voice became harsh and croupy, without any local appearances about the fauces to account for it, and with an absence of all febrile symptoms denoting laryngitis or croup. This alteration in the voice sounds could only be due, therefore, to the presence of a foreign body or to prolonged screaming. If the latter, it would pass off within twenty-four hours, and therefore the child was taken into the hospital and simply watched at first, in order to test the cause. Moreover, the child persisted in her statement that she had swallowed an ear-ring, so that the diagnosis was pretty confidently made that the foreign body was lodged in the larynx. Some few years ago I was asked to see a child whose voice had suddenly been lost some days previously after a fit of suffocation, with spasmodic coughing. The child had otherwise remained perfectly well, and when seen was breathing quite easily and calmly, but the voice was reduced to a hoarse whisper. I had the patient placed under the influence of an anæsthetic in order to make a more complete examination of the larynx, and with the tip of my forefinger dislodged a piece of orange-peel which was fixed somewhere in the upper part of the cavity of the larynx. The voice was speedily recovered and no further symptoms appeared.

The next case is that of a patient treated by Mr. Addenbrooke in the Kidderminster Infirmary.*

GLASS BEAD IN THE AIR-PASSAGES; TRACHEOTOMY; -- RECOVERY.—This case is one of some rarity, and may well be

* Lancet, July 13th, 1889.

read in connexion with the case under the care of Mr. Pick quoted above. In that case the foreign body was an earring impacted in one of the ventricles of the larynx, and it was removed after extension of the tracheotomy incision through the cricoid. In this patient the foreign body was impacted in the sacculus laryngis, and it is interesting to note the symptoms to which it gave rise, more especially the unusual attack of dyspnœa on the fourth day, which was so severe as to resemble that produced by a displaced or blocked tube, and the severe paroxysmal coughing, which was so distressing that chloroform had to be administered.

Minnie F—, aged six years, was admitted on Dec. 21st, 1888. Her parents stated that while playing the previous evening the child suddenly swallowed a large bead and became suffocated, remaining so for a few seconds, then her breathing gradually became easier, and she was taken to a doctor, who turned her upside down and shook her, but without expelling the bead: she had occasional choking fits during the night.

On admission the child breathed with considerable difficulty, and during the next hour had two sudden attacks of paroxysmal coughing, with much dyspnœa, lasting a few seconds only. The respiratory murmur was much fainter all over the right lung than on the left side, except over the third right costal cartilage, where very loud sibilant rhonchus of a high-pitched tone was heard.

A consultation was held and tracheotomy performed. Directly the trachea was opened a very violent attack of coughing ensued, but the bead could not be discovered. After the operation the breathing improved and the cough ceased.

Dec. 22nd.—No alteration.

23rd.—Under chloroform the tube was removed and the child inverted and succussed, but without result; nor could the bead be felt with a probe. Breathing sounds on right side the same as on admission, with some fine crepitation in addition. Tube reinserted.

24th.—Child losing strength. Sick twice. Temperature 99° 4°.

25th.—At 1 A.M. there occurred sudden acute dyspnœa, lasting about two minutes and ceasing suddenly. At 2.30 A.M. the patient awoke in a suffocating fit, and, after struggling violently for a few seconds, fell back apparently dead. Mr.

Rust, the house surgeon, took out the tube, inverted the child, and slapped her on the back sharply. In about six seconds a loud crowing inspiration occurred. The tube was reinserted, and artificial respiration maintained for a few minutes, the child gradually regaining consciousness. She was then seized with incessant paroxysms of coughing, and expelled some pus and a little blood through the tube. As the paroxysms continued, she was kept partially under chloroform for about an hour, and then fell asleep. The musical sound over the right bronchus had disappeared, and mucous râles were heard over the front of the lung; breathing took place entirely through the tube. At 9 A.M. chloroform was administered, the tube removed, and a probe passed upwards towards the sacculus laryngis, where a hard body could be felt. The was slightly enlarged upwards, and the bead (which was three-eighths of an inch in diameter, and perforated) removed with a vectis. Tube reinserted. The breathing rapidly improved.

26th.—Tube removed altogether.

There was a copious mucous discharge for two days, after which the wound rapidly healed, and the child was discharged well on Jan. 12th.

Although in these cases the foreign body was not that of a tooth or small plate carrying teeth yet the treatment adopted was of quite a similar kind to what would be adopted were the obstructing substance of this nature.

Intubation of the larynx although of value when the foreign body is so fixed as to be removable from the mouth would only complicate matters were it pursued in cases in which access to the trachea is necessary before the substance can be removed, and would of course be valueless as an adjuvant treatment for succussion. Were the proceedings tolerably easy it might be carried out to insure free respiration until the trachea could be opened, but unfortunately save in skilled hands, it is a measure by no means easy of adoption, and even then only when laryngeal spasm is absent. In connection with these cases those published by Mr. Paul Swain and Sir William McCormack which appeared in the *British Journal of Dental Science* throw considerable light upon the dangerous and puzzling complications liable to occur from foreign bodies impacted in the air passages.

Reflections from the Surgery.

REMARKABLE CASE OF THUMB-SUCKING.

By F. C. PORTER, L.D.S., House Surgeon, London Dental Hospital.

(Under care of Mr. H. LLOYD WILLIAMS.)

THE following case is interesting, not so much as shewing to any great degree the pernicious effects which the habit of thumb-sucking may produce on the mouth, but as illustrating in a remarkable way the fact that the fingers may suffer as well as the mouth.

The patient, a little girl, 9 years of age, came to the hospital for advice concerning the irregular condition of her teeth.

Upon questioning the patient's mother the following curious history was obtained. From the time when the girl was a baby 6 months old she has been a habitual thumb-sucker, but up to the age of $4\frac{1}{2}$ sucked one thumb only, viz, the right. At this time probably owing to the perforation of the skin by the biting edges of the right upper incisors and the entrance of septic matter, an abscess formed on the dorsum of the thumb in question. Nothing daunted the patient brought into requisition her left thumb, and has since indulged in the luxury of either thumb according to fancy.

The mouth on examination presented a somewhat peculiar aspect, especially on the left upper jaw. The right upper incisors were perfectly normal, save that the central was a trifle prominent. The corresponding teeth on the left however seem to have been impeded during their eruption as their biting edges are on a level considerably higher than are those of the right.

The left central was protruded very markedly, overlapping its antagonists to the extent of nearly quarter of an inch.

The left lateral, though not so prominent as the central, is considerably in advance of that on the right side.

The position in which the patient held her thumb while sucking it, was that of pronation, and hence subjected to

continued irritation from the biting edges of the right upper incisors. As an outcome of the continual irritation the epithelium on the dorsum of the 2nd phalanx of either thumb is thickened and hardened to such a degree as to have formed a true papilloma oval in form, the longest diameter being about the diameter of a threepenny bit.

REMARKS BY MR. H. LLOYD WILLIAMS.

The condition of the thumb in this case is I believe unique. This may probably be due to the peculiar position that the thumb occupies when sucked. The index finger is the favourite with some children and the persistent sucking of that finger brought about the greatest deformity I have seen at all. The distance between the left upper and lower incisor that the girl (æet 7) could introduce her finger a considerable distance into the mouth when the molar antagonized. In that case the finger was greatly enlarged over the 1st & 2nd phalanges. Her habit being to bend the finger and place the 1st phalangeal joint and as much of the rest of the finger as possible into her mouth.

ALUMINIUM SOLDER.—According to the *Scientific American* the following alloys may be used as solder for aluminium :

a.	Aluminium	8 parts ;	Zinc	92 parts.
b.	“	12 “	“	88 “
c.	“	15 “	“	85 “
d.	“	20 “	“	80 “

The aluminum is first melted ; the zinc added gradually. Finally some fat is added, and the whole is stirred with an iron rod and poured into moulds. For flux use copaiba balsam, 3 parts ; Venice turpentine, 1 part, and a few drops of lemon-juice. Dip the soldering-iron into the same flux.

British Journal of Dental Science.

LONDON, AUGUST 1st, 1889.

CLAUSE 37 OF THE DENTISTS' ACT.

MUCH important discussion is at present taking place upon this clause—which runs as follows.

Clause 37—"Any person who has been articled as a pupil and has paid a premium to a dental practitioner entitled to be registered under this Act in consideration of receiving from such practitioner a complete dental education, shall, if his articles expire before the first day of January, 1880, be entitled to be registered under this Act as though he had been in *bona fide* practice before the passing of this Act. Moreover it shall be lawful for the General Council by special order to dispense with such of the certificates, examinations, or other conditions for registration in the Dentists' Register required under the provisions of this Act, or under any bye-laws, orders, or regulations made by its authority, as to them may seem fit, in favour of any dental students, or apprentices who have commenced their professional education or apprenticeship before the passing of the Act."

Under the provisions of this obnoxious clause no less than 25 persons have since January 1st, 1888, managed to push their way into the Dentists' Register. We are told upon the authority of Dr. Waite that in the last decennium 234 persons have used this back way into the domains of registered Dentistry. These figures however appear to be inaccurate, as they include many names of persons who should fall into other categories, such as "in practice before 1878." In view of the highly unsatisfactory state of affairs which Mundella's clause

is liable to give rise to, Mr. Harding, of Shrewsbury as we mentioned in our last issue, suggested that the obnoxious clause should either fall into abeyance or be repealed. It has been pointed out elsewhere that abeyance is an evasion of the Act so that repeal seems to be the only card left to play, but one which we fear will not be no easy matter. Like all Acts of Parliament the Dentists' Act must of necessity fall short in many particulars, and those who have forgotten, or who never knew of the immense labour, self-denying industry and anxious thought which its drafting cost the *patres conscripti* of the profession, are apt to regard only the deficiencies which the act undoubtedly shows. The development of events and alterations which time brings about must inevitably bring to light, shortcomings in every act of reform, so that we cannot hope that the Dentists' Act should retain the respect it once received as a progressive and advanced measure. But although we earnestly hope for and work for repeal of Clause 37 we should oppose a piecemeal tinkering of an Act which will, eventually we feel assured, be recast, in other particulars as well as the excision of the obnoxious bantling of Mr. Mundella.

But in the meantime is there no help? Are we to be swamped by persons who, ignorant of curriculum or registrable diploma, seek registration under Clause 37. Fortunately it is stated upon the authority of the President of the General Medical Council that that body does not entertain any applications for registration under clause 37 unless they are accompanied by a certificate of Birth, a copy of the articles of apprenticeship as well as the statutory declarations.* Mr. Harding writing in our contemporary the Journal of the British Dental Association says :

“ The dire necessity for some restrictions beyond a mere statutory declaration will be apparent from the following facts :—

(a) One of the recent cases of registration under Clause 37 has been investigated. It was suspected that the age of

*See Journal of British Dental Association. June 1889.

the individual, if correctly ascertained, would sufficiently establish the irregularity of the registration; whereupon an effort was made to obtain a certificate of birth, first of all, in the locality where the individual is believed to have been born. This failed.

Afterwards, application was made to the Registrar-General; but no such person can be found! The gentleman who has conducted these enquiries is a patient and persevering investigator, and he has come to the conclusion that the name admitted to the Dentists' Register is an assumed name!

(b) Another recent case is that of an individual about whom those who know him well (a relative of his among the rest) declare that "he knew nothing whatever of dentistry five or six years ago." It would appear that moral evidence is abundant in this case.

It is a singular fact that so many of these registrations under Clause 37 come from a class whose antecedents are shrouded in uncertainty. The requirement of a certificate of birth, would, in all probability, have barred the first, while the demand for the production of a *bona-fide indenture* of apprenticeship—duly stamped—would certainly have stopped the second."

And in an article dealing with this subject from which we have before quoted, it is pointed out that a period of ten years is really too short in a parliamentary sense for us to judge whether or not the evil of "back-door" entries will not, if let alone, die out by themselves. We understand that each addition to the Register is very closely scanned by the executive of the British Dental Association, in order that any fraud may be detected, and that when doubtful cases arise that body takes active steps to ascertain the true state of affairs. This work, besides being arduous and invidious, meets with but little gratitude, although there can be no question that the whole profession is greatly benefitted by such actions, and owe a debt of gratitude to the Association.

FESTIVITIES AT LEICESTER SQUARE.—The usual Prize Distribution and Conversazione in connection with the London School of Dental Surgery took place on Wednesday, 17th ult. Guests, of whom there were a goodly number, were received by Sir John Tomes, F.R.S., in his usual genial way, and it was the general feeling that if he was glad to see them, they were all extremely glad to see him again in his rightful place, the fore front of the profession, encouraging and stimulating by his quiet but earnest words and manner. Lord Kinnaird, in distributing the prizes, improved the occasion with a speech. The event of the evening from the point of view of amusement was the wonderful performances of Edison's phonograph, which not only spoke into the body of the hall, but "discoursed sweet music from memory" that is to say, the phonograph on being "turned on" went through the performance of a full brass band, as well as repeating solos. In the adjoining room those who listened to the tubes of the phonograph heard not only the music but were regaled to a speech by Sir Edwin Saunders, the intonation of voice and individual mannerisms being perfectly reproduced. A more wonderful and interesting revelation of what science can do could hardly be conceived. The American lady who did showman to the phonograph contributed not a little to the success of the thing by her clear explanations and delightfully piquant manner. The music performed without the aid of the phonograph comprised solos by Mr. Hepburn, and others, a creditable rendering of the trial scene from "Judge and Jury" by the Dental Hospital's Musical Society as well as a medley performed by the "Dental Hospital's Band," the braying of the home made instruments producing hearty peals of laughter. The Editor of *Items of Interest* will be pleased to hear no smoking took place.

DENTAL STUDENTS AS SWIMMERS.—The energy of the Athletic club attached to the London School of Dentistry has found a fresh safety valve in starting a swimming club which

held its "Aquatic Gala"—we believe that is the correct term, Monday 22nd. Several excellent events were worked off and some prizes contributed by the Dean, members of the Staff of the Hospital, and Messrs. Ash, were pluckily contested in the presence of a goodly audience. The swimming under water competition, the prize to go to the picker up of most eggs from the bottom of the bath, led to a most exciting conclusion in favour of Mr. Mallet. The handicap gave rise to some most creditable swimming, and those who were not "placed" as well as the prize winners, were deserving of a "favourable mention" for their very good performances.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.—We are requested to state that the name of Mr. Felix Weiss, Vice-President and late Librarian, was by inadvertance omitted from the list of the Council issued in the last number of the Transactions. A corrected page will be sent out for binding.

THE AMERICAN DENTAL SOCIETY OF EUROPE.—This society will hold its Annual Session at 8, Boulevard des Capucines, Paris, on August 6th. Papers by Drs. Miller, Sachs, Bryan, Patton, Elliott, Chamberlain, Aaskell, and Fay; and clinics by Drs. Bonwell and Mitchell." Dr. St. George Elliot, of 39, Upper Brook Street, is acting as Secretary.

CELESTIAL DENTISTRY AGAIN.—We cannot vouch for the actual truth of the following because we are not on speaking terms with the "heathen chinese" in question, but we think that if he can do a "good business" in New York in the face of that city being pretty well set up by first-rate men using first rate instruments, he must be a rather remarkable oriental.

A Chinese dentist recently arrived in New York is doing a good business there. A curious visitor found that his methods, as well as the instruments used, were very primitive, yet he did his work like a genius. There was no easy-chair, nor the usual convenient little operating table alongside of the dentist. The patient sat upon a common camp-stool, and

there was a smaller stool of the same height for the foot of the dentist to rest on. The head of the patient was occasionally brought upon the elevated knee of the doctor, and upon the latter's right hand was his operating case, containing curious and quaint instruments. The rapidity with which the Celestial extracted a decayed tooth somewhat astonished the visitor. By close observation it was discovered that a certain liquid preparation of a whitish substance was first put upon the doomed tooth to deaden the pain and to loosen the root of the tooth. The filling of the cavities was accomplished with like rapidity with a substance which looked like tin-foil.

CARE OF THE TEETH IN SYPHILIS.—Dr. Joseph Zeisler, of Chicago, in an article of the treatment of syphilis, recommends the most diligent care of the teeth and gums, abstinence from tobacco and irritant substances, and the frequent use of an astringent mouth-wash during any form of treatment with mercurial preparations. The mouth will always require attention, as the saliva soon becomes impregnated with the drug and is the direct cause of mercurial stomatitis. Brockhart recommends a solution of 5 to 10 parts of tannic acid in 20 parts of glycerine, to 80 parts of water, for this purpose. The gums may sometimes become so tender as to make mastication very painful, and to necessitate an interruption of the administration of mercury. To overcome this, the same author has suggested the use of a 10 per cent. cocaine solution, to be painted on the delicate parts a few minutes before meals.

FORMULA FOR IODOL PASTE FOR FILLING PULP CANALS.

Iodol	...	...	gr. x.
Oxide of Zinc	...	...	gr. xx.

Vaseline of Carbolic Acid a sufficiency to make a thick paste. This formula, due to Mr. Van Woert, is reliable and satisfactory. A stiffer paste can be made by using Lanolin instead of Vaseline, and a flavouring of rose is a useful addition to mask the carbolic odour.

SPONGE-DRESSINGS.—Pieces of the finest, softest, and closest quality of sponge are washed clean and dried. They are then saturated with a 1 to 1000 solution of mercuric bichloride and cut into plugs of small and larger sizes, dried and kept at hand in stoppered bottles for use. The parings, in long slender points, are likewise conveniently preserved. Dr. Holt (*Dental Cosmos*) finds these slips particularly valuable for applying acids, etc., in the treatment of pyorrhœa alveolaris, fistulous abscesses, and the like lesions. He applies the sterilized plugs, suitably medicated when necessary, to the sockets of freshly extracted teeth. Sponge is much better for this purpose than anything else. Unlike cotton when taken from a wound, it all comes together and never leaves any fibres to hinder healing. Of course it may under some circumstances remain to serve the purposes of the well-known sponge-graft, but its principal and very satisfactory use is that of a vehicle for suitable dressings. A sponge plug saturated with a suitable styptic and covered with a larger compress plug saturated with sandarac varnish will effectively aid in controlling hæmorrhage following an extraction in a patient of a hæmorrhagic diathesis. Hardly anything can be better than small sponge plugs for closing accidental holes in rubber dam. Dip a pellet of sponge into sandarac varnish and push it half-way through the hole; it is a very bad leak if that does not stop it.

ANTIPYRIN AS A LOCAL STYPTIC.—A French Physician relates a case in which a boy of 14 suffered from persistent bleeding after the extraction of a molar tooth. Perchloride of iron was without effect, and so much blood was lost that syncope was induced. On recovery, the hæmorrhage again broke out and perchloride of iron was once more tried, but vainly. The cavity was then plugged with two or three pledgets of lint steeped in solution of antipyrin. The bleeding at once permanently ceased. It was noticed that while the perchloride caused severe pain, the antipyrin was not objected to. It is suggested, not improbably, that the antipyretic action of this and similar drugs may possibly be due to the fact that they diminish the blood-supply by their astringent effect on the blood-vessels.

Abstracts of British & Foreign Journals.

THE DENTAL REVIEW.

DESTROYING AND REMOVING THE PULP.

By DR. I. A. FREEMAN, Chicago, Ill.

WHEN called upon to devitalize the pulp of any tooth, the manner of procedure will depend upon conditions—whether the exposure be of long standing or recent, for if of long standing there probably has been pathological change of the pulp, rendering a certain course of treatment necessary before that of devitalization ; whether if there be such change it be in the form or state of congestion, or hyperæmia, whether hypertrophy has resulted, whether a portion of the pulp be in a putrescent condition, etc., for while these conditions will, to most practitioners, indicate that devitalization is best, and for the most part will result, still there are other steps indicated as preliminary or preparatory. Devitalize the pulp with the least possible pain, and without loss of time avoid complications. For instance, discolouration caused by infiltration of the tubuli by disorganized blood, and again by the complication of undue irritation of surrounding membranes. Hence, when the case has been decided and we have determined to destroy the pulp, we should endeavour to reduce the inflammation and restore the normal conditions as nearly as we may deem desirable, and then proceed to the work in hand. There are two general processes to achieve this, that of immediate extirpation by use of instruments direct, while the patient is in a partial or complete state of anæsthesia, or by the use of a local or circumscribed anæsthetic, as for instance, muriate of cocaine crystals or powder dissolved with carbolic acid, in the carious cavity in the anterior teeth and allowed to remain from ten to thirty minutes ; this will in many instances produce perfect anæsthesia of the pulp, if the exposure be recent. The other process is by the use of an escharotic. Each of these processes has its disadvantages and its peculiar difficulties. There are several escharotic agents that may be

used, but of them all, arsenious acid is usually employed. There are serious objections to the use of arsenic, and it should not be applied carelessly. The patient should be made aware of the importance of attending minutely to directions with reference to it, and the operator should use due precaution by way of protection against accident. The rubber dam should be applied, the cavity thoroughly dried and cleansed of all extraneous matter, the pulp fully exposed by removing the decayed tooth substance, so that the escharotic agent may be placed directly in contact with the pulp. Arsenious acid in combination with morphia, equal parts (either sulphate or acetate, some preferring one and some the other), and carbolic acid in sufficient quantity to make a thick paste, is recommended, muriate of cocaine may be added. The latter are used for their anæsthetic effects, and serve us very satisfactorily in this capacity. Arsenious acid, iodoform and carbolic acid crystals, in equal parts, and alcohol sufficient to make a thick paste, are recommended. The precise mode of action of arsenious acid is not well understood. It is a powerful escharotic, "so much so that although applied quite remote from the pulp, and in very small quantities, even so minute as to escape detection by the most delicate tests, it seems to have the power to destroy the pulp when the same quantity would seem to have no influence upon other tissues." Probably the action is in the line of irritation and consequent stimulation of the circulation, causing, as is thought by some, strangulation, and later, disorganization of the corpuscular elements of the blood, infiltration of the tubuli resulting in some instances. Hence the peculiar discolouration sometimes met with when the pulp is not fully exposed, so that the disorganized blood can not escape. Dr. Ingersoll thinks that thrombosis resulting from the peculiar irritation causes the death of the pulp, and accounts for the gradual death toward the apex in this way. To apply the paste or agent for the destruction of the pulp use a small portion, working it carefully down upon the pulp and pricking it into the pulp tissue with a small instrument. Cover by some kind of waterproof stopping material, to keep it from working out upon the tissues surrounding the tooth. Cotton, saturated with sandarac varnish, is used for this purpose. A very good plan is, to fix a metallic or other inflexible cap to cover the exposed pulp and paste, so that there may not be pressure directly upon the pulp by the stopping used, which may be

forced down upon it while the process of mastication is going on. It is a very good plan to allow the rubber dam to remain a short time after the application is made. Evaporation of the alcohol will take place to some extent, and the mass become stiffened so as to adhere to the margins of the cavity, and more perfectly close it against the fluids of the mouth. In cavities where but little protection can be had to retain the paste and stopping (as upon broken or fractured incisors) oxyphosphate of zinc may be used. It may be used in all cases, but owing to its hardness and the consequent trouble of removing, it is not best to use it generally. Gutta-percha and Hill's stopping are recommended by some, but he does not find either a desirable material to use where there is exposure of the pulp. The application should be removed in from twenty-four to forty-eight hours, the cavity well cleaned, the pulp cavity fully opened, and if the pulp be in a sufficiently insensible condition to admit of it, we should cut it away with the engine bur at this time. A light application should then be made to the remaining or root portion of the pulp, and stopped as before, and the patient instructed to return in twenty-four hours. At this sitting the remaining portion may be removed, if not too painful. If we are not able to do this the application should be repeated, and may be allowed to remain forty-eight hours longer, but it would be better to see the patient again in twenty-four hours. At the next sitting, if unable to remove the remaining portion, an application of some mild antiseptic agent (usually eugenol or oil of cloves is preferred). This application may remain four or five days, and may be repeated until sloughing has taken place at the apex, when the root branches may be removed with little difficulty, using broaches prepared by filing, those we find at the dental depots being too large to pass up the canals to the apex. Broaches should be barbed sufficiently to catch up the tissue and wind about the broach, as it is turned carefully, so as not to break the broach off in the canal by too vigorous twisting. After the canals are perfectly cleaned, disinfected and dried, the case is ready for the introduction of the filling material. The orifices of canals should be enlarged by proper drills to facilitate the introduction of the filling. Two other methods are mentioned. 1st. Instantaneous devitalization by use of an anæsthetic, nitrous oxide preferred. A smooth broach is passed to the foramen, and by rotation the pulp is lacerated. A pellet of cotton, saturated with carbolic acid, is instantly forced up the canal.

The pulp is said to be found in twenty-four hours in a coagulated mass, and is easily removed entire. 2nd. Orange wood, prepared by shaping to fit the canal as near as may be, and saturated with carbolic acid, is quickly driven into the canal to the apex. When the wood is withdrawn the pulp usually adheres. Should it not do so, the wood is quickly re-inserted, and cut off. It is then drilled out with Gates-Glidden drill, the pulp coming away at the same time. This manner is recommended after excision of the crown, preparatory to placing a bridge or crown upon the root thus treated, and is mostly confined to teeth with single roots, and where the exposure is recent.

JOURNAL OF THE BRITISH DENTAL ASSOCIATION

CONTINUOUS GUM WORK.

By WILLIAM SIMMS, L.D.S.I.

THE writer has shown that by the adaptation of the principle of the hot-air blast to the gas furnace, its capacity would be very greatly increased, and the necessary heat obtained with ease and quickness. To work these small furnaces satisfactorily it has been found that an abundant supply of gas or gasoline is necessary. In the case of gas, a pipe with a bore of not less than half-an-inch will be found to be necessary, and it is also important that the regulating tap should have a bore of the same diameter. In a new gas furnace shortly to be introduced to the profession, by a suitable arrangement of pipes, and by the utilisation of the waste heat of the furnace merely, a heat can be obtained of over 2000° Fah. in less than eight minutes, and the Allen gum body and enamel fused in that time. He speaks highly of Fletcher's Benzoline Apparatus, as a substitute for gas. It is equally applicable for use with the hot blast, and it has one great advantage over it, viz., it can be used quite safely with a cracked muffle, without fear of discolouration. The use of a foot bellows for both gas and benzoline is necessary, and Mr. Fletcher's No. 5 Bellows will be found to be quite satisfactory. Referring to the construction of artificial dentures in continuous gum work, he says no English teeth will stand the necessary fur-

nace heat. Massey's teeth keep their colour best of English make (but are unfortunately liable to crack), but all others hopelessly lose their colour, and some of them their shape also. White's and Justi's teeth of American make are quite reliable, and, while they keep their colour well, rarely, if ever, crack. Teeth, even of the same American manufacturer, seem, however, to vary somewhat, as some of them (especially of the less dense kind) are liable to become blistered in the firing process. It is necessary to use hard platinum plate as a rigid base for the artificial gum; except in complete sets, when the base-plate is wholly of platinum, when thick soft metal may be preferred. But otherwise No. 4 hard platinum may be used, or in cases of very weak shape a size thicker may be used with advantage. If the case in hand is to have a base-plate of vulcanite, and if moderate thickness of artificial gum is allowable, the teeth should be arranged in the usual way in wax and tried in the mouth. If found correct, the incisors and bicuspid may be taken off the wax plate (a plaster bite having been previously taken to facilitate the replacement of the teeth), the wax so removed as to provide for a thin base-plate of rubber, leaving a wax rim which, when reproduced in rubber, will afford protection to the thin edge of mineral gum on the labial surface. As the mineral gum-facing is intended only to go back as far as the second bicuspid, the molars are left standing. Castings are now to be obtained and a narrow platinum plate struck up. If, the case, when completed, must have the gum portion too thin to allow of the thickness of rubber, platinum plate, and mineral gum, the narrow plate must be so struck up as to directly fit the model without an intervening plate of wax; but before casting, the model should be so arranged as to provide for the turning up of the platinum plate to afford a protection for the frail edge of mineral gum. The plate struck up, the teeth are waxed to their position and the case invested for soldering, in a mixture of plaster and asbestos in equal proportions. The wax removed, a band of platinum plate should be fitted under the pins of the teeth, and extended to the base-plate. The pins are now bent over the band, and the whole heated up for soldering. For this process only pure gold should be used, and to thoroughly flow it, a blast bellows will be found necessary. When removed from plaster investment, and after thoroughly freeing from borax, &c., by pickling in hydrochloric or nitric acid, the surface of the plate is roughened or indented, and all

is ready for the application of the gum body. The only gum body and colour at present obtainable at the dépôts are those prepared by S. S. White, from the formulæ of Dr. Allen, and fortunately these are satisfactory. In the manipulation of the body, a spatula and several small camel-hair pencils are necessary, and a stiffer brush to free the teeth from any adherent particles which otherwise would fuse to the teeth and render them unsightly. In applying the body use merely sufficient water to make the particles of body adhere. It will add greatly to the strength as well as to the appearance of the piece if the mineral gum is applied to the palatal as well as the labial surfaces of the plate. The body having been contoured to the judgment of the artist, and particular care having been given to the definition of the necks of the teeth, the thin end of the spatula should be passed through the material as if to divide the body into as many sections as there are teeth. The piece may now be placed in the furnace and should be sufficiently fired in about six minutes from the time the gas is lighted. When cold enough to take out to handle (which will be in about $1\frac{1}{2}$ hours) it will be found that by the contraction of the material the slits made by the spatula have enlarged to twice or thrice the size, but otherwise the piece should not be cracked. During the first firing of a piece there is inevitable contraction, and it will be found better to determine the lines of fracture by previous separation than to allow the piece to crack irregularly, as it certainly would if no lines of separation were made. A second firing is always necessary to fill up the cracks caused by contraction, and it is desirable to give the second firing a minute longer than the first, that is, about seven minutes. The final firing is for the gum colour, which should be applied on the body to the thickness of a threepenny bit, and a little thicker between the teeth, where a deeper colour is natural. In firing for this final process it will be found that about eight minutes is the time required, but the exact moment can only be determined after a little experience. When the piece is just about lost to sight is the moment for turning out the gas. It should be remembered that the end of the muffle furthest from the mouth is the hottest, and for that reason two pieces cannot successfully be fired at the same time, except when one piece is for the firing of the gum body, and the other for the firing of the colour; in such a case the piece having on the colour would be placed in the hottest end of the furnace. It

is desirable to rest the pieces on platinum gauze or plate but with hard plastic intervening. In firing the gum colour, it is better not to too highly glaze the surface of the gum, as in this condition there seems to be a greater liability to craze or crack than when the gum is a little less highly vitrified. Indeed, this matter of crazing is one of the difficulties to be overcome, for although the cracking of gum colour is no serious detriment to the strength of a piece, it undoubtedly detracts from its value as a work of art. To prevent crazing, it is better after the piece is finally baked to thoroughly close up the front of the furnace to prevent the ingress of cold air, and by this means to spread the final cooling process over four or five or more hours. Probably a cap or cover of asbestos sheeting over the whole furnace would delay the cooling for some hours. According to present experience the most satisfactory way of attaching a gum facing to a vulcanite set, the (presuming the gum section to represent ten or twelve out of fourteen teeth) is to solder a platinum wire to each end of the piece (before firing) and allow it to be imbedded under the molar teeth further back. For the replacement of a tooth, however, the fractured tooth can be ground away with the corundum wheel, a new tooth filled and fastened with vulcanite in the ordinary way. For the attachment of sections where the plate is stamped to fit the model direct, the method of procedure is equally simple, as loops of platinum can readily be soldered to the palatal portion of the plate for attachment to the vulcanite plate.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

ORDINARY MONTHLY MEETING, June 3rd, 1889.

Mr. HENRY SEWILL, M.R.C.S., L.D.S.,

President, in the Chair.

THE Minutes of the preceding meeting having been read and confirmed,

The President announced that Mr. George T. Parkinson had stated his intention of resigning the ordinary membership

of the Society, owing to failing health, which obliged him to retire and live in the country. The council had determined to recommend to the Society that Mr. Parkinson should be elected an Honorary Member, as he had been among its most staunch early supporters, and had done very much for its welfare in its younger days when its friends were fewer. Mr. Sewill felt that all would regret the cause of Mr. Parkinson's resignation, and would hope that ere long they would again see him amongst them.

Mr. Browne-Mason had known Mr. Parkinson for very many years, and he knew the Odontological Society never had a truer friend than he, or a more helpful and loyal supporter. Mr. Parkinson had always been ready to assist the younger men in his profession, and so he knew there were many of his friends present.

Mr. G. T. Parkinson was proposed and elected an Honorary Member by acclamation.

Mr. Sidney Spokes, having signed the obligation book, was formally received into the Society by the President.

Mr. Charles Winterbottom, M.R.C.S., L.D.S., of 16 Sloane Street, S.W., was balloted for and duly elected a Resident Member of the Society.

Dr. George Cunningham (Cambridge) and Mr. H. Robinson read a note

On the Formation of Ammonium-Magnesium Phosphate by Micro-organisms.

The authors desired to call attention to the observation, originally made by Mr. Robinson, of fine, well-formed crystals being formed in many tubes of nutrient gelatine and agar-agar, in which cultivations of micro-organisms were growing. Some micro-organisms produced crystals in two or three days, notably some from the human mouth; others only after some weeks. On analysis the crystals proved to consist of the double Ammonium-Magnesium phosphate, or so-called triple phosphate ($\text{NH}_4, \text{Mg}, \text{PO}_4, 2\text{H}_2\text{O}$). Mr. Solly, of Cambridge University, had also examined their crystalline form and found them identical with that of the mineral Struvite. The evidence, on the whole, seems to point to the direct formation of the ammonia by the micro-organisms from the media in which they are growing, and to its combination with the magnesium phosphate already existing in the nutrient substance to form the double phosphate. The authors think the

depositions of tartar on the teeth, and the formation of some calculi in other parts of the body, may be due, in part at least, to this action produced by micro-organisms. They purpose continuing their investigations with a view of elucidating this point in a more extensive communication.

Photographs, crystals, and cultures were exhibited.

At the suggestion of the President, discussion was deferred until Dr. Cunningham's fuller communication could be read before the Society.

The Secretary, for Mr. J. Charles Storey (Hull), read the following :—

*Report of Fracture and Treatment of the Incisive Portion
of the Superior Maxillæ.*

On the 27th of April, 1889, Clive S——, a little boy, aged eight, in good health, was referred to me by the family medical attendant, to whom he had been taken for fracture of the superior maxillæ. I saw him about two hours after the accident. The four superior incisors were projecting forwards at an angle of 45°. Very little swelling or hæmorrhage had occurred. On enquiry, I found that when out with the nurse he had in play jumped from an elevation of about two feet, evidently with his mouth open, and had struck against the cross-bar of the perambulator. On examination I found that the fracture appeared in the lines between the intermaxillary bones and the superior maxillæ.

I at once sent for the medical man, who administered chloroform, after which I reduced the fracture. The projecting part, with some little difficulty, yielded to steady backward pressure, and when started went almost into position with a palpable click. It did not, however, go perfectly close. I then took impressions and made a vulcanite plate capping the molar teeth, to raise the bite ; to this I attached a dental alloy retaining-band carefully fitting, with pressure, the anterior surfaces of the incisors : this for the purpose of pressing and holding in close juxtaposition the fractured portions. This has been worn almost continuously for about a month. The parts are quite firm, union appearing to be perfect—there is no discolouration of the incisors, the pulps of which seem to be living.

Mr. Betts remarked that he had met with a somewhat similar case. His patient, a gentleman, who had whilst performing the duties of an amateur bell-ringer, met with an

accident. He was lifted off his feet and dashed by the back swing of the bell into the belfry, and struck his jaws against a projecting beam. The upper jaws were smashed, the incisor portion being dislocated. Under gas the displacement was reduced and the case did well. The pulps of the dislocated teeth were, however, dead, giving no response when tested with hot or cold fluids.

The President remarked that fracture of the jaw when occurring in children always did better than the corresponding injuries in adults. He called upon Mr. Browne-Mason for his communication.

Mr. Browne Mason said : Mr. President and Gentlemen : The interest that I think attaches to the happily unusual sequence of tooth extraction I bring before you to-night is my excuse for the following statement, that I think may be interesting to this Society.

On Saturday, May 25th, Harriet Leach, an agricultural labourer's wife, forty-three years of age, attended Okehampton Market that morning apparently in ordinary health ; she went to her usual medical attendant, Mr. Burd, for the removal of the root of a tooth, as she was suffering from neuralgia, when the operation was followed by death eight hours after under the following circumstances. (I quote from the medical evidence at the subsequent inquest.)

Mr. George V. Burd, surgeon, deposed that Mrs. Leach came into his surgery on Saturday afternoon, and requested him to take out a tooth, as she was suffering from neuralgia. He told her he did not think it would relieve her neuralgia, but she still expressed a desire to have the tooth extracted, and he consented to do it. It was a small stump, which came out without difficulty. Deceased afterwards washed her mouth out with some water, and then became a little hysterical. Witness moistened her face with a wet towel, and suddenly her breathing stopped. With the assistance of Mrs. White he laid her on the floor. Deceased did not faint ; her breathing simply stopped, although her heart continued to beat. Artificial restoration was resorted to and continued for eight hours. Death took place at half-past eleven o'clock. Except artificially, she did not breathe during the whole of the time which elapsed until her death. In his opinion she died from apoplexy. He had attended her for three or four years. She had always complained of neuralgia, headache, and giddiness, and at times could not keep her head up. One

of the small blood vessels at the base of the brain was probably ruptured, causing pressure on the nervous centre, which stopped her breathing. Any slight shock might have produced the rupture. Mr. E. H. Young, surgeon, described the condition of the deceased when he was called in to assist at half-past five o'clock. She was quite unconscious; breathing had ceased, but the heart was still acting. Everything possible was done to restore animation. He concurred with Mr. Burd as to the cause of death, and added that the blood vessel might have been broken without any shock at all. The jury returned a verdict of "Death from natural causes."

I wrote to Mr. Burd, asking him if there was anything he could add to this report, and he replied as follows:—

"The newspaper report is correct. The woman had suffered from severe headache for several years, and in all probability had an aneurism at the base of the brain, which of course was not detected during life, the rupture of which caused the paralysis of the breath centres. I have no doubt that many cases of apoplexy are fatal in the same way, only that no medical man is present to perceive that the heart is still acting, and therefore they die at once."

The point of interest to us is that there is apparently nothing to indicate the existence of such apoplectic tendency as existed in this case; but fortunately such cases are very rare. I never came across such a sequence in my neighbourhood, in either my own or fellow-practitioners' experience. It is I think a matter open to discussion as to whether an anæsthetic in such a case would have averted the effect of shock. My own idea is that nitrous oxide, through its action on the brain, may have in such a case proved in itself fatal, and that this would be a case where there would have been less risk to life from ether or chloroform inhalation.

Mr. Sewill felt the value of the case was greatly lessened, as no autopsy had been held. He could not understand how any coroner could allow such a case to be enquired into, and yet omit to get medical testimony as to the post-mortem condition of the patient, as the whole question of how the individual met with death hinged upon what would be discovered at a necropsy. Any discussion about the matter would be, Mr. Sewill thought, absolutely idle, as they could only speculate, but were unable to prove anything. Dr. Ferrier, whose special knowledge of brain lesions might assist them, would

perhaps explain what condition he should expect to find judging from the clinical evidence before them.

Dr. Ferrier said he could only re-echo what had fallen from the President ; he felt any discussion upon the facts was simply a waste of time. Dr. Ferrier thought they were quite without evidence whereby to answer the question Mr. Browne-Mason had put as to whether nitrous oxide would have been prejudicial or dangerous in the case. The best authorities were quite doubtful as to whether a death had ever occurred directly traceable to nitrous oxide gas, so that he should hesitate before saying that agent would have been contra-indicated in the case in point.

The President then call upon Dr. Ferrier for his paper on Some Relations of the Fifth Cranial Nerve. [See page 653]

At the conclusion of Dr. Ferrier's paper.—The President said, I am sure that it will be the wish of this Society that I should especially thank Dr. Ferrier for his kindness in reading this paper before us to-night. It is not an unusual circumstance for us to receive distinguished visitors whose presence is a compliment to the Society ; but I am quite sure it will be your wish that I should convey to Dr. Ferrier how highly we appreciate the compliment he has paid us. He has himself done more than most living men to make a new epoch in physiological science. It is impossible to discuss the physiology of the nervous system without taking into account the new facts he has established, and the theories which those facts suggest. We are the more indebted to Dr. Ferrier because he rarely reads papers at Societies. I knew that he had an enormous amount of material, and I feel personal obligation to him that he yielded to my solicitation.

Such a paper as we have just listened to requires to be digested, and it is not easy at once to discuss it ; but I trust those members who may have questions to ask or observations to make from a pathological and clinical standpoint will not hesitate, as the time remaining at our disposal is limited.

Mr. H. Baldwin : I should like to ask Dr. Ferrier if in his opinion the sense of taste in the anterior two-thirds of the tongue is the same in quality as that in the posterior one-third. I have always been under the impression that the special sense of taste lies in the posterior one-third, and that the anterior two-thirds was only endowed with an acute degree of ordinary tactile sensation. I have frequently experimented

upon my own tongue by means of galvanism, and I have always found that galvanism of the anterior two-thirds produces only a pricking sensation, while galvanism of the posterior one-third produces always a very marked sense of taste as of some metallic salt such as chloride of zinc or nitrate of silver.

Mr. C. S. Tomes : The point in Dr. Ferrier's paper which seems to be of the greatest interest is the anatomical relation between the visceral nerves and the fifth. From time to time in our dental literature, one finds cases where pain is referred by the patient to the facial region, or, even more exactly, to the teeth. This has been attributed to some visceral lesion, and with the disappearance of the visceral lesion the neuralgia has also disappeared. I must confess that I have often thought the recorders of these cases somewhat credulous and sometimes almost gullable people, but not always so. To-day I have seen a patient who has an intense neuralgia of the fifth nerve. He is suffering from a tumour of the prostate, possibly malignant. This has increased to the extent that a supra-pubic operation is contemplated. As his prostatic symptoms have varied, so in like manner has his neuralgia. There is no cause for the neuralgia to be traced in any way to the teeth, but when his other trouble has become very bad his facial neuralgia is intense. But the anatomical relation which Dr. Ferrier has shown us as to the connection between these nerves shows that it may be not only gullable people who place faith in the connection between facial neuralgia and distant sources of irritation. The case I have mentioned of course proves nothing, but is merely interesting in the light of the nervous connection which Dr. Ferrier has shown to exist.

Mr. R. H. Woodhouse : Dr. Ferrier in his paper spoke very fully and completely on the subject of the sensation of taste, but I did not catch from his remarks whether, or how far, he considered the upper palate had any connection with taste. As dentists we often find that the sense of taste is lost for a time, but is afterwards recovered. I think that the sensation of taste is not fully developed until the tongue comes in contact with the upper palate, therefore I think that the part played by the upper palate is a question we should like an opinion upon.

Dr. Ferrier : I beg to thank you for the very kind reception which you have given my paper. The discussion this

evening has shown the value of different specialists occasionally meeting and discussing some point of common interest. Many suggestions have been made which I regard as of great value in my own enquiries.

As to the sense of taste there are still many points requiring investigation. People appear to differ greatly as to the relative development of the sense of taste in different parts of the mouth. I should myself say that the anterior part of the tongue is capable of appreciating every kind of substance in greater or less degree, though there is no doubt that the back of the tongue is the most sensitive. This has been regarded by Bain and other psychologists as an inducement to digestion. What are the nerves of taste from the anterior pillars of the palate and soft palate is the subject of differences of opinion. Probably they are branches of the glossopharyngeal. Mr. Tomes' remarks justify my having devoted so much of my paper to Gaskell's researches. For these appear to me to have an all-important bearing on this subject. The relation of the fifth to the visceral nerves indicated by these researches furnishes a clue to the explanation of many familiar facts otherwise obscure.

The President, having put the usual vote of thanks, which were duly honoured by the Society, announced that the next meeting would take place November 4th, when a paper would be read by Dr. Felix Semon, F.R.C.P., "On some points in the Etiology, Diagnosis, and Treatment of Empyema of the Antrum."

The Meeting was then adjourned.

STUDENTS' SOCIETY. NATIONAL DENTAL HOSPITAL.

The last Ordinary Monthly Meeting of this Society was held on Friday, June 7th, 1889, at 8 o'clock, p.m., Sidney Spokes, Esq., President in the Chair.

The Minutes of previous Meeting were read and confirmed. Miss Day signed the Obligation Book, and was formally admitted as a Member by the President.

Mr. G. Levers and Miss Loenen were present as Visitors.

CASUAL COMMUNICATIONS.—Mr. Allnutt asked whether it

would be advisable to inject Cocaine into an insane person. A discussion took place, in which Messrs. Fisk, E. C. Clark, Dunlop, and the President took part.

Mr. E. C. Fisk shewed a case of Fibroma extending from the Canines to 1st molar on left upper side. It was removed by him, and treated with Ethylate of Sodium, but as the hæmorrhage was so extreme, he was obliged to use the actual cautery which brought about the desired result. Also that for some time past, he had dispensed with the mouth-prop in gas cases. Patients were simply told to keep the mouth wide open, the result being that 5 out of every 6 cases were eminently successful.

Mr. Clark mentioned a case of a gum-boil posterior to an apparently dead 2nd upper bicuspid, arising from the 1st do. stump. Also another case of abscess after extraction of a lower molar. No more Casual Communications coming forward the President called upon Mr. E. C. Fisk for his paper on "*Dental Education*," which was of a highly interesting nature, and was accompanied by diagrams. A discussion was opened on the Paper, in which Messrs. T. G. Read, Clark, Perks, Allnutt, Dunlop, Miss Day, and the President took part, after which Mr. Fisk replied to various remarks, was heartily thanked, and the Meeting adjourned till Friday, October 11th, 1889.

ARNOLD PRAGER, *Hon. Sec.*

Dental News.

AN UNREGISTERED DENTIST AT NEWPORT.

AT Newport County Police Court on Saturday, before Mr. D. Whitehouse (in the Chair), and Dr. A. Davies, Moses Abel was charged with using the title of dentist, without being registered.—Mr. Melsheimer instructed for the British Dental Association appeared to prosecute. He said, The Act 41st, 42nd Vic. Chap. 33, which would be found on page 10 of the Dentists' Register, section 3, provided, that any person who took or used the title of dentist without being registered under the Act, was liable, on summary conviction, to a fine not exceeding £20. It was not competent for a person to use

the title of dentist without being registered, although he might possibly be a skilful practitioner and capable of carrying out the duties of the profession. The question before them was not whether the man was a disgrace or an ornament to the profession. He mentioned this because sometimes in cases like the present the plea was set up that the man was a competent dentist, although he was not registered, but this did not palliate the offence. The Register was *prima facie* evidence, and he put this in. He then proceeded to call evidence. Mr. Thomas Smith a clerk to Messrs. Bowman and Crawley-Boevey, the solicitors to the British Dental Association, was sworn and said that on Thursday, the 27th of June last, he called at the defendant's house, 3, Archibald Street, Maindee, and saw the defendant Moses Abel, and asked him if his name was Moses Abel, and he said it was. He then shewed him a card and circular, both bearing his name and the word "dentist." He asked him if the circular was his, and also if the card was his. He said they were.—Mr. Melsheimer at this point drew the attention of the Bench to the wording of the circular, which was headed "Please read this carefully." It also contained the name of "Moses Abel, surgical and mechanical dentist," and then followed reasons why the public should go to him in preference to other dentists. He handed one of the circulars to the magistrates, and mentioned that the card also contained the defendant's name and the word "dentist." The witness Smith continued and told Moses Abel he was not entitled to use the word "dentist," and said, "You are infringing, by so doing, the Dentists' Act, 1878." He told him that he supposed that he, of course, knew about that Act. He said, "Yes, I do." "You know about the Dentists' Register?" and he said, "Yes, I do." He also said, "My father practised for many years as a dentist, although he was not registered, and I consider I am entitled to do the same." He then said, "You reckon you are a dentist?" He said, "Certainly, I do." He contended that many people practised without being registered, but I said that had nothing to do with it. Mr. Melsheimer explained that it would be found in the last paragraph of the 4th Cap. of the Act of 1878 that the prosecution could only be instituted with the consent of the General Council of Medical Education and Registration of the United Kingdom; but under the Act of 1886 the prosecution could be instituted by a private person. He had nothing further to prove. Defendant said he had

been in practice with his father since 1876, and in the early part of 1877 began to practise for himself. In consequence of his father's financial misfortunes, they went to the States, and did not return until 1882. His father knew nothing at all about the Act, neither did he. That was all he had to say. He knew nothing whatever about the Act. The Chairman announced that the case was clearly proved against the defendant, and he would be fined the small amount of £3, including costs. He advised defendant to get registered as soon as possible, or else he might be brought there again and a much heavier penalty imposed. The Bench then decided to impose a penalty of £1 and £2 costs.

“THE DENTISTS ACT 1887.” VICTORIA.—
REGULATIONS.

IN accordance with the provisions of, and in exercise of the powers conferred by *The Dentists' Act* 1887, the Administrator of the Government, with the advice of the Executive Council, doth hereby make the subjoined regulations for the examination of persons desiring to obtain certificates of fitness to practise dental surgery or dentistry, that is to say:—

REGULATIONS.

No. 1.

Candidates for examination under the Dentists' Act, Victoria, No. 960, shall (except in cases hereinafter provided for by Regulation No. V.) produce evidence that they have for the four years during which they have been “engaged continuously in the acquirement of professional knowledge” (sec. 18, clause D of the Act) completed the following educational course:—

- (a) Matriculation at the University of Melbourne or the passage of some examination recognised by the University as equivalent thereto, such matriculation or examination to include passing in Latin, English, arithmetic, algebra, and geometry, as compulsory subjects of the examination.
- (b) Attendance on the following courses of lectures and demonstrations at some period subsequent to such matriculation or examination:—
 - (1) A course of lectures on materia medica at the Univer-

sity of Melbourne or at the Melbourne College of Pharmacy, or at any School of Pharmacy recognised by the Pharmacy Board of Victoria as equivalent thereto.

- (2) Two courses of lectures on anatomy at the University of Melbourne, or at any school of Anatomy recognised by the University of Melbourne as equivalent thereto.
- (3) Two courses of lectures on Physiology at the University of Melbourne, or at any School of Physiology recognised by the University of Melbourne as equivalent thereto.
- (4) Two courses of lectures on Chemistry at the University of Melbourne, or at the Melbourne College of Pharmacy, or at any School of Pharmacy recognised by the Pharmacy Board of Victoria as equivalent thereto.
- (5) A course of dissections at any Medical School recognised by the Dental Board of Victoria.
- (6) A course of clinical lectures and hospital practice during a period of not less than two years at any hospital recognised for the purpose by the Dental Board of Victoria.
- (7) A course of lectures on medicine and surgery by lecturers appointed for that purpose by the Dental Board of Victoria.
- (8) Two courses of lectures on Dental Anatomy and Physiology by a lecturer appointed by the Dental Board of Victoria.
- (9) Two courses of lectures on Dental Surgery and Pathology by a lecturer appointed by the Dental Board of Victoria.
- (10) Two courses of lectures on Dental Mechanics and Metallurgy by a lecturer appointed by the Dental Board of Victoria.
- (11) The practice during a period of not less than two years of a dental hospital recognised by the Dental Board of Victoria, and the practice, as an indentured pupil with a registered dentist for a period of not less than three years.

No. 2.

Candidates for the certificate issued by the Dental Board of Victoria under The Dentists' Act, Victoria, No. 960, shall, subsequent to the completion of the foregoing educational course, present themselves for examination before the Dental

Board of Victoria, and shall be examined in all the subjects of their professional studies.

No. 3.

The fee for the examination before the Dental Board shall be £10 10s.

No. 4.

Candidates who have completed the foregoing educational course and passed the foregoing examinations shall be entitled to the certificate of qualification issued by the Dental Board of Victoria.

No. 5.

In the case of all apprentices who have been indentured previous to the gazetting of these regulations, and such other persons as have applied for registration within eighteen calendar months since the coming into force of the Act, the Board may at its discretion admit to a modified examination ; such modified examination to consist of—

1. Mechanical dentistry—

Theory, illustrated by models, &c.

2. General—

(a) Elementary Anatomy and Physiology.

(b) Elementary Surgery and Pathology.

3. Dental—

(a) Elementary Anatomy and Physiology.

(b) Elementary Surgery and Pathology.

No. 6.

The fee for such examination shall be £5 5s.

No. 7.

Candidates who have passed the foregoing modified examination shall be entitled to the certificate of registration issued by the Dental Board of Victoria under the Dentists' Act, No. 960.

And the Honourable Alfred Deakin, Her Majesty's Chief Secretary for Victoria, shall give the necessary directions herein accordingly.

G. WILSON BROWN,
Clerk of the Executive Council.

ROYAL COLLEGE OF SURGEONS IN IRELAND. DENTAL EXAMINATION.

The following gentlemen have been admitted Licentiates in Dental Surgery of the College, viz.—F. E. Garner, Bradford, Yorkshire; T. M. Howkins, Guernsey; E. Mawer, High Wycombe, Buckinghamshire; W. D. Quinn, Dublin; F. Sheppard, Hastings; and C. H. J. Williams, Croydon.

APPOINTMENTS.

Mr. Thos. Jackson jun. L.D.S. has been appointed Honorary Dental Surgeon to the Victoria Hospital of Burnley (Lancashire).

There has been no previous appointment.

Underwood, Arthur Swane, M.R.C.S., L.D.S., has been appointed to the Chair of Dental Surgery at King's College, and Dental Surgeon to King's College Hospital, vice Ashley Gibbings, resigned.

VACANCIES.

Victoria Dental Hospital of Manchester.—The Committee of Management are prepared to appoint a Dental House Surgeon. Applications to be made before the 10th of August, to H. L. Knoop.

Western General Dispensary, Marylebone Road, N.W.—Honorary Dental Surgeon.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

ATTEMPT TO DEFRAUD.

To the Editor of the "British Journal of Dental Science."

SIR,—May I ask the favour of a small space in the next issue of the Journal, to warn members of the profession that a person, who is quite unknown to me, has been begging from some members of the profession, and fraudulently representing himself to be,

Yours truly,

GRAHAM W. WHITE, L.D.S.I.

Newport, Mon.

British Journal of Dental Science.

No. 518. LONDON, AUGUST 15th, 1889. VOL. XXXII

ON SOME RELATIONS OF THE FIFTH CRANIAL NERVE.

By DAVID FERRIER, M.D., F.R.S.

Concluded from page 660.

There can be no doubt that the glosso-pharyngeal is the nerve of taste for the posterior third or base of the tongue. The proof of this, however, depends more on anatomical and experimental evidence than upon clinical facts—isolated disease of the glosso-pharyngeal being extremely rare, if occurring at all. The glosso-pharyngeal, however, is distributed to the circumvallate papillæ. These undergo atrophy when the glosso-pharyngeal nerves are divided, and animals still retain the sense of taste, as is very plainly evident from their gestures, after section of both fifth nerves.

An interesting case has recently been reported by Rendu in the *La France Médicale*, May 11th, 1888, bearing on this question. The case was that of a man aged thirty-four, who on his admission to the hospital on June 25th, 1888, presented left facial paralysis which had existed some time, and complete deafness of the left ear, which had set in later. There was no affection of the sensibility of the face. The sense of taste was intact at the anterior part of the tongue, but impaired posteriorly. The tactile sensibility of the mouth and tongue was unimpaired except in the region of the pharynx. It is not necessary for my present object to mention the other details of the case; suffice it to say, after death, which occurred in October, a glioma was found implicating the nuclei of origin of the facial, auditory, and glosso-pharyngeal nerves. The case is, therefore a clinical confirmation of the

functions ascribed to the glosso-pharyngeal in respect to gustatory sensibility.

While, however, there is practical unanimity among physiologists as to the fifth nerve being subservient to the sense of taste in the anterior two-thirds of the tongue, there is still considerable uncertainty as to the course which these nerves take in their way to the brain. It is, however, commonly believed that the gustatory fibres do not run directly in the lingual branch of the fifth, but diverge into the chorda tympani, and thence pass through the geniculate ganglion and the greater or lesser superficial petrosal nerves, and so reach the second division and ultimately pass into the trunk of the fifth nerve.

It is said by Schiff that though taste is abolished in the anterior two-thirds of the tongue when the lingual is divided after junction with the chorda tympani, this result does not ensue when the lingual is divided *above* the point of junction. The experiments of Bernard, Lussana, Schiff, &c., would seem to show that the sense of taste is at least impaired, if not entirely abolished, when the chorda tympani alone has been divided. The occurrence of loss of taste in the anterior two-thirds of the tongue in connection with facial paralysis, assumed to be due to lesion of this nerve below, or at the geniculate ganglion, is regarded as substantiating this view, and furthermore it has been stated that irritation of the chorda tympani in disease of the ear produces a prickling or subjective gustatory sensation in the anterior two-thirds of the tongue.

It is in reference to some of these points that I wish to bring before you some recent observations of my own.

I have recently had two cases under my care which are distinctly opposed to Schiff's view that the nerves of taste for the anterior two-thirds of the tongue run in the second division of the fifth nerve. In the case already several times referred to, the inferior division entirely recovered its functions, and with these the sense of taste in the anterior two-thirds of the tongue. The superior and middle divisions however, remained, and continue till the present day, absolutely paralysed. Notwithstanding the complete block in these two divisions, however, the path of taste is completely free, showing that the gustatory fibres cannot leave the third division and reach the brain by the second or superior maxillary.

In the other case, David P., aged sixty, who had suffered

for several years with severe epileptiform tic on the left side, Mr. Horsley performed Carnochan's operation, and divided the superior maxillary nerve outside the foramen rotundum, extirpating at the same time the greater portion of Meckel's ganglion. He subsequently divided the descending palatine nerve. Yet this patient, though he became anæsthetic in the region of distribution of the superior maxillary nerve, retained his sense of taste absolutely unimpaired on the left side of the tongue. Eight months afterwards the inferior dental nerve was divided owing to a return of pain in this region. Ten months afterwards, owing to a return of the pain in the molar and orbital regions, Mr. Horsley operated again with a view to extirpate if possible the Gasserian ganglion. The foramen ovale was exposed from the zygomatic fossa, and the inferior maxillary nerve divided just outside, that is, just above the junction of the chorda tympani. It was not found possible to expose the Gasserian ganglion, but the remnant of the superior maxillary nerve which had been previously cut was further exposed and resected inside the cranial cavity. After this third operation there was complete abolition of tactile and gustatory sensibility in the anterior two-thirds of the tongue. This case may therefore be regarded as proving that the nerves of taste for the anterior two-thirds of the tongue run directly in the lingual nerve, and not in the chorda tympani. For the operation was so performed as to avoid section or obvious injury to the chorda tympani. At the present date (May 14th), *i.e.*, six months after the operation, the patient is entirely free of his neuralgia, but there is not the same absolute abolition of tactile or gustatory sensibility which occurred immediately after the operation. This, however, is only an instance of that recurrent sensibility which is known to occur even when the sensory nerve of any particular district has been thoroughly excised. It cannot be explained on the supposition that the chorda tympani, partially damaged, had again resumed its functions, for along with the lingual the superior maxillary nerve was also extirpated, and there was a return not only of gustatory sensibility, but also of tactile sensibility in the regions formerly anæsthetic.

I have already alluded to the constitution of the chorda tympani according to Gaskell's researches. It is, as we saw, a continuation of the nerve of Wrisberg which is a rootlet distinct from the other roots of the facial, and is composed almost entirely of the smallest or visceral nerves. Gaskell

states that there are a few fibres of larger dimensions mixed with these, the relations of which are uncertain; but it cannot be denied that the great bulk of the fibres of the nerve of Wrisberg, and the branches of the geniculate ganglion belong to the ganglionated efferent nerves of the splanchnic system.

It has been stated by Vulpian that the chorda tympani does not undergo degeneration after section of the seventh nerve within the skull; but this is easily explained by the fact that peripheral degeneration is stopped by the geniculate ganglion. The chorda tympani is the secretory nerve of the sub-maxillary and sub-lingual glands and is probably also the vaso-dilator nerve of the anterior two-thirds of the tongue. Considering the small size of the chorda tympani, it seems almost an anatomical impossibility that this nerve, which undoubtedly contains a majority at least of efferent fibres, should also be equivalent to act as the nerve of special sense of such a large region as the anterior two-thirds of the tongue. And it has always appeared to me very unlikely that the nerve of special sense of the anterior two-thirds of the tongue should take such a roundabout course before reaching the brain as is involved in Schiff's hypothesis. Lussana and others believe that the fibres of the chorda tympani run directly into the nerve of Wrisberg. That the nerves of taste do not run in this nerve is proved by the fact that destruction of the facial nerve within the skull does not abolish the sense of taste in the anterior two-thirds of the tongue. Among other cases in proof of this, I would allude to that of Rendu cited above. I do not attach much importance to the prickling or obscure gustatory sensations said to have been caused by irritation of the chorda tympani in cases of disease of the middle ear. These may be purely reflex phenomena, or the result of vascular changes in the tongue.

The only facts therefore which remain in favour of the chorda tympani being the path of the gustatory fibres for the anterior two-thirds of the tongue are the frequent occurrence of loss of taste in this region in connection with peripheral facial paralysis. How are these to be explained? I have unfortunately in a very large number of cases of this affection not specially investigated the sense of taste, but recently I have attended to this point more carefully, with the result that in cases apparently similar in their etiology, I have found quite as many, if not more, cases in which taste was absolutely

unaffected as the reverse, and in those in which there has been loss of taste I have never failed to obtain evidence also of some degree of implication of the fifth nerve. The association of pronounced affection of the fifth nerve together with the seventh is by no means uncommon; but occasionally the affection of the fifth is so partial, or slight, as readily to escape observation. And I am inclined to think from the facts which I am about to lay before you, that the loss of taste in the anterior two-thirds of the tongue in connection with facial paralysis, is not due to affection of the chorda tympani, but to joint implication of the inferior division of the fifth nerve.

The following case recently came under my care at the Queen's Square Hospital, on May 25th, 1888. Elizabeth C., aged twenty-five, a somewhat anæmic, ill-nourished girl, was admitted complaining of paralysis on the right side of the face, and deafness, with discharge from the right ear, which had lasted for seven or eight months. She was also subject to fits and the paralysis of the right side of the face came on in one of the fits three or four weeks before admission. There was complete facial paralysis, with total abolition of faradic excitability, on the right side of the face, and total deafness in the right ear. The membrana tympani had a whitish appearance, but no perforation could be seen. There was also total loss of tactile and painful sensibility on the whole of the right side of the tongue and mucous membrane as far back as the arch of the palate. There was complete loss of taste in the anterior two-thirds of the tongue, but she could taste bitter quite distinctly on the posterior third, though the sensibility was perhaps not so acute to sweet and other sapid substances as on the other side. In this case therefore the fifth nerve was so obviously affected that the loss of taste on the anterior two-thirds of the tongue could not be ascribed to lesion of the facial nerve, though this was probably affected in the aqueduct of Fallopius.

The next case is one in which the affection of the fifth nerve was not so pronounced. Elizabeth W., aged thirty, domestic servant, consulted me on December 16th, 1888; she exhibited typical facial paralysis on the right side, which had come on fourteen days previously. There was total abolition of faradic excitability and well marked reaction of degeneration in the paralysed muscles. Hearing was equal on both sides. The sense of taste was greatly impaired on the anterior two-thirds

of the left side of the tongue. Careful investigation proved further that there was also a similar impairment of tactile sensibility on this side of the tongue. There was also decided impairment of tactile sensibility on the lower part of the cheek. The sensibility of the regions supplied by the superior and middle divisions of the fifth were unimpaired on the left side. In the course of a fortnight tactile and gustatory sensibility had entirely returned in the regions formerly affected, while the motor paralysis continued as before.

The case also shows that the loss of taste was accompanied with similar loss of tactile sensibility, altogether inexplicable by any affection of the chorda tympani pure and simple.

Case 3 illustrates the same fact :—Hyman F., aged twenty-five, consulted me on March 8th, 1889, for facial paralysis on the left side, which had come on eight days previously. The paralysis was of well-marked peripheral type, but the faradic contractility was only slightly diminished on the paralysed side. There was well-marked loss of taste on the anterior two-thirds of the left side of the tongue. There appeared to be no loss of tactile sensibility, as the patient could indicate that he felt, and correctly localised, a touch on the left side of the tongue. This case seemed to me to contradict my previous experience, viz. : that the loss of taste was always accompanied by loss of tactile sensibility ; but on subsequent more careful investigation, I found that though there was no absolute loss of tactile sensibility, yet by careful comparison with the other side, the tactile sensibility was decidedly impaired, not only on the left half of the tongue, but also in the lower facial region, as in case 2.

Case 4.—I am obliged to my friend and former pupil, Dr. Ewens, for the particulars of the following case. Dr. Ewens had helped me in some of my investigations on this point, and therefore had his attention specially directed to the matter.

A. B., aged seventeen, consulted him in November, 1888, at the Stanhope Street Dispensary, for complete paralysis of the left side of the face, which had come on four days previously. There was no affection of the palate ; hearing was normal, and there was no affection of the ear. There was loss of taste on the anterior two-thirds of the tongue. There was also slight but distinct impairment of tactile sensibility on the left side of the tongue, lower cheek and jaw. The patient recovered from his facial paralysis in less than a fortnight, and taste and tactile sensation returned somewhat later.

Case 5.—Letitia W., domestic servant, aged twenty-four, came under my care at King's College Hospital, February 25th, 1888. She stated that on the evening of the 21st she was exposed to severe cold, and on getting up the next day observed that her face was drawn. On the 25th she had a fit and became unconscious. There was a probable specific history. There was complete paralysis of all the muscles of the right side of the face, and drooping of the left eyelid. There was no difference in the electrical reactions of the two sides of the face. Though tactile sensibility was greatly impaired on the right side, forehead, cheek, side of the nose, buccal cavity, right side of the tongue, sensibility was less impaired on the lower facial region than in the upper. There was complete loss of taste in the anterior two-thirds of the tongue, and she appeared occasionally to have some doubt as to the posterior third. Hearing was diminished in the right ear. A few days after admission sensation of the face and tongue and the sense of taste had considerably improved, and on the fifth day was quite normal. A fortnight after admission the facial paralysis had diminished so that she could just close her right eye, but the deafness on the right side increased, and when examined by Dr. Pritchard was found to have complete internal ear deafness on this side. She left the hospital on the 12th of March, but returned again on the 23rd, complaining of pains on the left side of the chest. The paralysis of the face had considerably improved, and the deafness of the right ear had passed off. In the course of a month all traces of the affection of the face had entirely disappeared. She had been treated with antispecific remedies.

The various facts which I have brought before you furnish, I think, at least a strong presumption that in cases of facial paralysis accompanied by loss of taste in the anterior two-thirds of the tongue, there will be found on careful examination some other indication of implication of the fifth nerve, and that in all probability this has escaped observation in the cases which have been put on record of apparent loss of taste altogether apart from impairment of tactile sensibility in the tongue or other region supplied by the fifth nerve.

It will probably occur to some of you to ask why the sense of taste should be ministered to by two separate nerves—the lingual and glosso-pharyngeal. The answer to this question is without doubt to be sought in the morphological relationships of the regions endowed with gustatory sensibility.

There is reason to believe that so far as taste is a somatic function and connected with the movements of the tongue in mastication, it is subserved by the fifth nerve; and in so far as it is a splanchnic function and related to the act of deglutition that it is subserved by the glosso-pharyngeal. We may thus term the lingual, the somatic, and the glosso-pharyngeal the splanchnic nerve of taste.

THE RELATIONS OF THE TOOTH-PULP TO THE OTHER TOOTH-TISSUES*

By L. C. INGERSOLL, D.D.S., KEOKUK, IOWA.

To interpret nature is the sublimest problem offered to the human mind. The chief object in nature is man.

The problem of human existence is unfathomable. But, seeing that man exists, we cannot silence human thought until there appears written somewhere the answer to the question, Why? We may take his physical dimensions and construct a model as perfect as the highest skill of human genius can make it, and say, There is man. You may put him upon the scales and interpret him as so many pounds, ounces, and grains of the matter composing the physical universe. You may bring chemistry to your aid and find out the different elements of nature composing his substance, and interpret him as so much oxygen, hydrogen, nitrogen, and carbon, but can you say then that you know man? You may know, further, that there is something in his nature that eludes chemistry because it is a something that is not matter, which you call life, mind, spirit, soul. You have seen him now in his physical and in his spiritual aspects, but have you interpreted man? To find him out thus far has been easy work, but you know him only in his primary relations,—the different parts of himself to himself. But you scarcely know him at all until you know his relations to the universe. This knowledge answers the question, Why does man exist?

You may find a seed floating in the air, or pick one up out

*A paper read before the New York Odontological Society and reported in the *Dental Cosmos*.

of the dust ; you may analyze and know the elements composing it, but until you know its relations to the plant-life of the world, and to animal life as well, you do not know that seed. A tooth is a very small part of the human body, but you cannot know that tooth until you know the life-functions residing within it ; and you do not know that life-power, the so-called dental pulp, until you know its relations to the surrounding tooth-tissues, and its relations to the life of the body.

The early anatomists regarded the teeth as bones, and the internal soft tissue of the teeth as marrow,—an inert, soft, unctuous mass of matter, with no physiological function. In my youthful days it was not uncommon to hear persons speak of teeth being decayed to the *marrow*. The earliest dentists of my acquaintance called it the *nerve*. The more intelligent part of the people generally called it the *nerve* of the tooth. When and by whom it was first called pulp I do not know. It seems to have been an aristocratic rival of the word *marrow*, and to have been transferred to our dental literature from the nomenclature of medical science. This is one of many instances of our dental science suffering by inheritance. The word *pulp* means nothing, physiologically speaking ; for it signifies nothing more than a mass of something—anything, it matters not how characterless. When the paper-maker grinds up rags until he has destroyed the entire texture and the fibre of the original fabric, and with sizing has mixed it into a watery jelly, he calls it *pulp*. When the cider-maker grinds up fruit, destroying every appearance of its original form and structure, it is then called cider *pulp*.

The word pulp can only properly be applied to a formless, structureless, functionless, soft mass of matter ; and it belittles and degrades that highly sensitive organ of tooth development and life to call it *pulp*. We, as dentists, in common with all mankind, know the organ experimentally by its chief characteristic, the manifestation of pain. All such manifestations, wherever found, are attributed to the nervous system. In harmony with this prevailing experience and scientific fact it is every way appropriate to call it the *internal dental nerve*. No valid objection can be found in the fact that within the chamber of the tooth are also found blood-vessels and connective tissue. All nerves are largely connective tissue, and blood-vessels accompany nerves everywhere. It

is probably true, also, that the cell elements of the organ are nerve-cells.

It will be well for dental science if we can fix in our minds a more definite classification of nerves strictly denominated dental nerves. There are semi-circular loops of nerves hanging from the superior maxillary nerve, and surrounding the antrum, known as anterior, middle, and posterior dental nerves, but none of these reach the teeth. Branches are thrown off from them equal in number to the roots of the superior teeth which pass down to and into the roots. These are the proper *dental nerves*, and should be known as the *external* dental nerves; and, after passing through the apical foramina of the teeth, the same should be known as the *internal* dental nerves; for these external and internal dental nerves which I have described are *the* nerves supplying nerve-influence to the teeth. In the drawing which I have made, the proper relation of these nerves is distinctly brought to view; the teeth themselves not being represented, the direct connection of the external and internal dental nerves is more apparent, also the direct connection of the internal dental nerve with the brain. We can trace its connection through an important branch of the fifth nerve to the Casserian ganglion, to the upper portion of the medulla oblongata, and to the brain. Let me now turn your attention to the morphology of the internal dental nerve. It is first seen as a little thickening point in the dermal tissue,—a slight eminence above the plain of the surrounding tissue,—not differing from it, however, except as showing a tendency to greater vascular development. It rises until we designate it as a papilla. It is seen now to have numerous blood-vessels projected up into it, forming loops which anastomose with one another, accompanied also with numerous inosculating nerve-fibres. Gradually it assumes somewhat the form of a tooth.

In this vascular soft-tissue development we see it in the largest dimensions it ever assumes. From this time on through its entire future its diminishes and changes the relative proportions of the different kinds of tissue which enter into its structure. Its chief function is the nutrition, growth, and development of another and a new kind of tissue, wholly unlike itself,—a hard-tissue tooth. The materials for tooth-construction are all brought in through the channels of the blood-vessels. They are the traffic ways of the new structure. Hence we find the vascular tissue far

in excess of the nerve-tissue. In the development of the hard tissue there is perpetual demand for lime-salts, which must be freighted in the blood-current. As the hard tooth-structure nears completion the freighting business is not in so great demand. The blood-channels contract. The supply of blood is reduced in proportion to the lessening demand. Hence it will appear that the vascular tissue is not constant in its proportion to the other tissues of the organ. Hence, also, any histological examination of the organ to learn its elementary constituents would show a larger proportion of vascular tissue in the early age of the patient, when the tooth structure was developing, than later in life, when the hard structure is nearing completion. Yet I have never seen this plain common-sense fact recognized in any report of the different kinds of tissue composing the so-called pulp.

Another, a pathological fact, should also be recognized in making the estimate. Inflammation induces a determination of blood to the inflamed part, and a consequent enlargement of the blood-vessels to accommodate the increased supply of blood. When the blood-vessels are confined, as in the chamber of a tooth with unyielding walls, their expansion takes place at the expense of the other tissues occupying the same chamber, changing their relative proportions. Hence examination will show the tissues of an inflamed pulp to differ in their proportions from those of a healthy pulp.

Going forward now to the period of adult life, when there is very little, if any, tooth-development in progress, and little or no demand for lime-salts, the vascular system of the vital tissue is reduced to its minimum. If you have occasion to extirpate the vital organ of a sound and healthy tooth, and perform the operation surgically instead of by the use of poisonous vital irritants, you will find but a mere tinge of blood following the operation. The same rude extirpation of the organ when inflamed will be followed by a free discharge of blood. The former, when exposed to view, will appear like a grayish-white cord with a mere tinge of blood at its apical extremity and covered throughout its extent with a colourless lubricant, while the latter will appear like the mangled bloody fibres of a piece of beefsteak.

The foregoing observations, patent to all, lead me to say that in adult life the internal vital organ of a healthy tooth consists almost exclusively of nerve-tissue, which has in its structure a considerable amount of connective tissue. This

leads us by another train of thought and observation to the conclusion that this internal organ of tooth-life and sensation can most appropriately be called the *internal dental nerve*.

Let us now observe its relations to the life of the tooth. Certainly we have no conception of an active physiological process without the manifestation of life. In fact, the activity and working of developmental processes in organic bodies is so different from all motion and activity in inorganic bodies that it necessitates the use of a term to distinguish it from all other activities and forces. Hence we term it life-force, and the tissue constructed by it we term living tissue. An important practical question faces us here for an answer.

When the life-force operating within the chamber of a tooth ceases its activity, is the tooth dead?

It may cease its activity in either of two ways,—either by dormancy or death. From the former condition it may be restored to activity under appropriate stimuli. The life of a tree and of various insects and reptilia becomes dormant through the winter; but under the revivifying influences of spring activity returns. The organ of tooth-development comes into a like condition of dormancy when the tooth has reached a stage of completeness to fully perform the functions that nature requires. It may be restored to activity and a renewal of its former functions by irritation from without, such as mechanical abrasion or dentine decay.

Death of the living organ within presents other aspects of the case entirely different. Does death of the nerve necessarily involve and render certain the death and decomposition of the entire tooth-structure? Fortunately, a tooth has an external as well as an internal source of life through which it maintains its vital connection with the living body. So long as life and functional activity remain in the peridental membrane, a tooth cannot be said to be *dead*.

Yet we hear it affirmed not infrequently, by those to whom we look as good authority, that when the nerve of a tooth dies the hard structure begins immediately to disintegrate like dead matter. The relation of life to the soft tissues renders decomposition a necessary and inevitable consequence of death of the part. The same is not true, however, of the hard tissues of the teeth. Mineral substance is under control of another law than that of life, which renders it in its nature indestructible under ordinary influences, except we bring ages into the calculation. When, then, perishable animal substance

is brought into organic union with imperishable mineral substance, the mineral imparts to it something of its own imperishable nature. This is one of the mysteries of organic life,—that when mineral substance is brought under the sway of the life-force developing either animal or vegetable tissue, each is made to partake of the peculiar characteristics of the other. Hence the large per cent. of mineral substance entering into the structure of teeth as a component element renders them practically imperishable under ordinary influences.

We are now prepared to take up the question of the so-called dental pulp as an organ of nutrition. That it performs the function of nutrition so far as concerns its own substance cannot be doubted. But does it perform the same function to the tissues of the tooth outside of itself?

In order to give the proper limitations to the consideration of the question, it will be necessary to consider, first, nutrition in general as applied to organic functions.

All living bodies take into themselves, through the proper channels, food. All living bodies have also some process by which that food is digested and assimilated so as to become part of the animal or vegetable organism. As this is a vital process, it is as continuous as life, and results in a daily increase of the size and dimensions of the body, unless there exist some limitations in the nature of the tissue itself, or some preventive economy in nature to counteract developmental increase. This counteracting economy is found in the daily waste of tissue as the result of functional action. With the daily supply of aliment to increase the tissue there comes the daily waste of tissue as a check upon increased development. Nutrition is, therefore, simply supplying the waste of tissue, and the requirement of nutrition is in exact correspondence to the waste. Waste is a functional process carried on chiefly by the lymphatic system. The fact of waste and renewal of tissue is so generally recognized, that physiologists have estimated that once in about seven years the entire substance of the body is wasted and renewed. If this is literally true, there is not to be found to-day a single atom of the substance that was an elementary constituent of my body seven years ago, or whatever time it requires to complete the cycle.

The study of the law of waste and renewal of soft tissues of the body and of bones will lead to this conclusion. But there is no evidence that the teeth conform to the same law. A bone may lose substance by disease or by a surgical operation

and the lost part be functionally restored. Not so with the teeth. There is no evidence that the substance of the enamel or of the dentine, when wasted from whatever cause, is ever renewed. After the death of the enamel organ, there is no evidence of functional action in enamel. Whatever there may be found of a "reticulum" of animal matter in enamel, there is no evidence of its being *living* matter. It is wholly atrophied and rendered incapable of functional action. If, then, there is no waste of enamel by functional action, there is no demand in nature for nutrition of enamel. Enamel once formed must remain the same, except that it may be changed, as it no doubt is, by external influences. It may take to itself by affinity carbonic acid from the atmosphere, and thus become hardened, the same as do various other lime-formations.

The case is not so clear as regards dentine. Yet common observation concerning it points with convincing proof to the fact that dentine once formed needs no renewal and therefore no nutrition. We are all familiar with the fact that the peripheral portion of the dentine in the crowns of teeth does sometimes in middle life, and usually in old age, attain a density utterly precluding the possibility of functional action. We have the same fact illustrated in the finger-nails, in the extremities of the cow's horns, in the corticular portion of a deer's horns, in the tusk of the elephant, and in the teeth of rodents, whales, and dog-fish, from portions of which all life and sensation have departed, and they may be cut, sawed, or drilled without any response of life, the nerve having become functionally obliterated. This is the operation of nerve-extirpation performed by nature. Will nature be guilty of committing a "crime" against herself?

If the dental nerve may be extirpated from portions of the dentine most exposed without creating a tendency to disintegration, why may it not be removed from the whole tooth, and the integrity of the tissue be preserved?

Proof of the imperishable nature of the teeth is found when human bodies are exhumed after a burial of hundreds of years, the teeth being all that remain in form and firmness of structure.

If of such enduring material as to resist decomposition after death for hundreds of years, it would be sublime folly indeed to presume that in life they needed to be renewed, like the perishable soft tissues, once in seven years. The conclu-

sion that I draw, therefore, is this,—that the substance of the teeth is in its nature of such imperishable material that when once wrought into tooth-forms under the domination of vital forces it remains for indefinite periods after the life-force has become extinct, and that the organ of development and nutrition is no longer a necessity after completion of the structure ; that to whatever extent animal tissue remains as a component part of hard tissue after its full development, it atrophies ; and whatever degree of vitality remains in the pulp, nerve, or whatever you may please to term the developing organ, it becomes dormant, and can be aroused into future activity only by nature's necessity for reparative work. Let no one now say, as has been reported in this society, "Ingersoll says that teeth are as good without nerves as with nerves." The numerous instances of the formation of secondary or reparative dentine in cases of wearing away of the teeth after middle life are evidence of the value of the living organism within, whose chief function at this period of life is to do this work.

On the other hand, we find that the reparative work of nature in resisting decay is usually a failure. The conditions are such that the progress of decay is more rapid than the work of dentine repair. Hence the exposure of the nerve is, in most cases, inevitable.

With this prospect of failure in nature's reparative work—with the opportunities that most dentists have had to observe that the dental nerve has but a feeble hold upon life after its developmental work is completed, and that the slightest wound or even irritation often proves fatal to its life—with the evidence the profession have had in the past that the operation of "capping" in a large majority of cases results in but a brief prolonging of the life of the nerve without changing its natural tendencies to obliteration under the very slightest adverse influences,—I can but regard all efforts to save the nerve of a tooth alive when its bulbous portion is exposed or nearly so, as empirical in the extreme and surrounded with great doubt. In every case, therefore, of dental neuritis, either from abrasion or decay, I am bound, as a conscientious practitioner, to consider the chances of failure in my treatment ; not to consider simply what I would like to do, but also what I can reasonably expect will be the result of my work, both in the immediate and remote future. I prefer, therefore, to take the risk and the chances surrounding the operation of extirpation rather than those of capping

believing that the former offers the better chances of success for the long future.

Now I have something to say concerning sensitive dentine, and the relation of the internal dental nerve to it.

For the purpose of making my remarks plain I wish to call your attention to the common, yet deceiving, illustration in the books of the tooth tissues *in situ*.

An incisor-tooth, for example, is divided longitudinally. The nerve tissue of the tooth is described as occupying a central cavity corresponding in its general outline to the form of the tooth, having its greatest diameter in the crown, and its least diameter in the extreme end of the root, where it becomes a mere thread as it passes out through the apical foramen.

The dentine is described as surrounding this nerve-tissue and constituting the chief body of the tooth. It is composed of both animal and mineral tissue, in the proportions of about twenty-five per cent. of the former and seventy-five per cent. of the latter. It is tubular in its structure, the tubules being occupied by soft-tissue fibrils known as fibrils of the dentine—*dentinal fibrillæ*. I said that this illustration is deceiving. It represents these fibrils as parts of and belonging to the dentine; hence the name *dentinal fibrillæ*. When these fibrils are in a pathological and hypersensitive condition, we are accustomed to attribute the sensation to the dentine and call it *sensitive dentine*, or *hypersensitive dentine*, thus anatomically and pathologically uniformly associating these fibres with the dentine.

When a dentist is excavating a cavity in such dentine and his patient cries out, "You are in to the nerve," he assures the patient that he is nowhere near the nerve,—that the sensitiveness is only that of "sensitive dentine." With this assurance he proceeds to excavate. The patient again cries out, "I cannot stand it! you are working right in on the nerve." The dentist again assures him that he *is not* touching the nerve; "it is nothing but sensitive dentine." "What makes it hurt, then?" the patient asks, vexed with pain. The uniform answer is repeated, "Sensitive dentine."

The operator is using the language of theory,—the language of the books; the patient is using the language of fact and feeling,—the language of common sense, and not the language of fancy and fiction. If the operator would speak the truth he would acknowledge that he was cutting off the fibrils,

not of the dentine, but fibrils of the internal dental nerve,—the fibrils of the so-called pulp. Instead of that, he, for the time being at least, deceives himself and his patient also with the false idea that these are fibres of the dentine.

Let me now put it in other very common language. The patient says, "The nerve is *exposed*." The operator insists that the nerve is not "exposed,"—that it is yet an eighth of an inch in to the nerve. "Well, it aches," says the patient. "What makes that?" Again the confounding answer comes, "Sensitive dentine." If I shut down a window-sash upon your finger, you will very likely complain that I am hurting your hand. Will it be a very satisfying answer to you if I say, "Your hand is not caught by the window-sash,—nothing but your finger"?

I complain to the court that you have disfigured, wounded, and mutilated my valuable dog. You go into court and swear that you did not touch the dog; that you only cut off his tail; that the operation was not within six inches of the dog!

We must cease to entertain the idea that sensation belongs to the dentine, and cease to use language that may convey such a meaning. And in every operation upon the teeth we must have our minds fully possessed of the fact that all sensation developed in the dentine is really to be attributed to the internal dental nerve; that when the so-called dentinal fibrils are wounded the pulp is wounded, for they are fibrils of the pulp, and not of the dentine; that when inflammation is excited in the nerve-fibrils that inflammation may, and often does, extend to the nerve and produce dental neuritis (I want to get rid of the word *pulpitis*). We know well enough that when a finger is wounded the inflammation may, and often does, extend to the whole hand. We also know experimentally that the operation of filling even a pin-head cavity in the remotest angle of a tooth sometimes does cause the death of the nerve. What must be the danger, then, in larger cavities? When grinding off the enamel of a tooth to re-shape the crown for the adjustment of artificial caps, crowns, and bridge-work, a large number of nerve-fibrils are often exposed thereby, causing the death of the body of the nerve. Dentists should become fully possessed with the idea that the nerve of a tooth is exposed, in a *pathological* sense, whenever the nerve-fibrils are exposed, and that they are exposed whenever you pass the enamel which covers the lining dentine.

I wish now to present another view,—a very practical point in operative dentistry. In this day, when immediate root-filling has become somewhat popular, it is worth our while to examine it in all its aspects. The operation is surgical, medicinal, and mechanical, and has its basis in the theory that in the treatment of diseased teeth in which root-filling is contemplated all that is required in preparation for the mechanical operation is a thorough removal of the contents of the internal cavity, whether it be living or dead tissue, give the root-canal the proper antiseptic treatment, then fill at once,—the entire operation being performed at the same sitting,—trusting to *vis naturæ* for the result.

Take the case of a tooth requiring extirpation of the nerve ; you expose it sufficiently for the operation, and with a nerve-hook or other instrument draw it out bodily, having previously applied the devitalizing agent ; or you devitalize by percussion, driving into the canal with a sudden blow a sharpened point of wood. After removal of the lifeless tissue you lay it out upon a piece of white paper, and have in its outline and dimensions the general form of the internal cavity of the tooth, and you fancy that you have drawn out the *entire pulp* bodily. What has become of the pulp processes,—the nerve-fibrils ? There were hundreds of them ramifying the dentine, and constituting part of the living organism which you are attempting to extirpate. If you have not drawn out these nerve-fibrils, you certainly have not drawn out the *whole* nerve. You have done the same as the bushwhacker who draws up the young tree, leaving the roots in the ground. Earth is a good antiseptic, but it will not preserve the roots of a tree from ultimate decay. Ramifying the dentine as the fibrils do, to the very periphery, and there uniting with the lacunal cells of the cementum, is it any wonder that the peridental membrane should become diseased, and the tooth itself feel sensitive and sore to the touch ? The treatment of the nerve-fibrils becomes, therefore, the critical part of the operation of nerve extirpation. They must inevitably decompose at some time. This tendency may be restrained for a while by antiseptics ; but like herring and ham antiseptically treated, moisture and warmth bring on a taint at last.

Were it possible in the nature of the case to draw out a dental nerve entire, with all its processes attached, and it then be laid out upon paper with its processes or fibrils diverging as in position in a tooth, the internal dental nerve would

appear like a bone-corpuscle or like a multipolar nerve-corpuscle.

The last division of my subject to which I wish to call your attention is *the ganglionic nature of the dental pulp*.

This part of my subject cannot be comprehended or studied *per se*. It must be studied as a part of the nervous system. The isolated location of the internal dental nerve anatomically—confined as it is by walls of dense ivory, connected only by a nerve-fibre with the general nervous system—renders the mistake a natural one to disconnect it in thought and study from all relation to the nervous system. We can study any other organ as differing from all the others in its form, structure, and functions. But when we come to the study of the nervous tissue we find that nerves are of the same kind everywhere in the body,—that the nerves of one organ do not differ from the nerves of any other organ.

The nervous system has one common centre of nerve-power and function,—the brain. Touch a nerve in the remotest part of the body, and its sensation is referable to the great sensorium, the brain. If we desire to learn what nerves are, we must first learn what the brain is ; we must know its substance and its functions.

Nerves are simply prolonged fibres of the brain ; they are the distribution of brain tissues throughout the body. The brain, on the other hand, is simply nerve tissue in mass. It is constructed so as to generate the largest amount of nerve-force and influence within the smallest space, and adequate to supply the whole body. It is, therefore, in every sense a nerve-centre, the *great* nerve-centre of the human body. It is called the *great* nerve-centre with reference to several small nerve-centres distributed throughout the body, which are centres of nerve influence for different organs or limited territory variously occupied. These smaller nerve-centres are also commonly called ganglia, and in harmonious nomenclature the brain is called the great ganglion. The ganglia are also called little brains. Thus it appears, at least by the nomenclature of the science, that nerve-tissue is the same throughout the body. As the great ganglion is a mass of nerve-tissue, the small ganglia are masses of nerve-tissue for the generation of nerve-influence for particular organs, all reporting to the great sensorium. Wherever, then, a mass of nerve-tissue is found with nerve-fibres projecting from it and reach-

ing out to peripheral regions, it is called a ganglion,—a nerve centre.

Two kinds of substance are recognised as constituting nerve-tissue—one grey, and the other white. The grey is made up of nerve corpuscles, and the white is fibrous in its structure. The ganglia are masses of the grey matter traversed by threads of the white. Cleland says in his work on animal physiology, "Any nervous mass containing nerve-corpuscles is called a ganglion."

Before making any examination of the internal dental nerve to learn the nature of the tissue and its structure—whether it be corpuscular or fibrous, or both,—let us trace back the dental nerves through the line of the fifth nerve to their origin, and learn their ancestral character and what developments we may possibly expect in harmony with the character of the original.

The fifth nerve arises from the upper portion of the medulla oblongata by two roots—one a small root from the motor system, and the other several times larger, a sensory root, from the great sympathetic system. This sympathetic system is very generally known as the *ganglionic system*. True to the nature of the principal root, it forms the Casserian ganglion. This great sympathetic nerve in which the fifth nerve has its origin, and to which the nerves of the teeth belong, is called the ganglionic nerve, because of the numerous ganglia formed throughout its distribution, and especially as all physiologists affirm, near their terminal ends. We find, therefore, developed on the fifth nerve, in addition to the ganglion of Casser, the ophthalmic ganglion, Meckel's ganglion, ganglion of Cloquet, Arnold's ganglion, submaxillary ganglion, and the most distinctly marked of all, the *dental ganglion*, at its last distributing point, the so-called pulp. In addition to these which I have named, there are numerous smaller ganglia, notably a ganglion formed near the apical portion of the root of each tooth. These are commonly called nerve plexuses. But they correspond more nearly to the structure of ganglia than to plexuses; not being formed by decussation of two or more nerves, but by a division of the fibres of a single nerve, and forming several from a common centre. These go to supply the peridental membrane, the gum, the inter-alveolar bone, and one or two branches are sent into the chamber of the tooth through the apical foramen. Here the

nerves divide into an innumerable number of fibres running by circuitous routes among and into the cell elements of the structure, and apparently terminating at or a short distance within the tubules of the dentine. Whether there is a real or only an apparent termination near the openings into the tubules, we may be able to learn hereafter.

Let us now for a while divest ourselves of some misconceptions of the nervous system so common among professional men,—that it is made up of bundles of white cords separated at intervals into their individual fibres, and distributed through all the organs and among all the tissues of the body like a skein of white silk. This idea first comes to the mind through the illustrative plates so commonly given in works on anatomy. Then it is demonstrated to the student on the cadaver: the nerves of the body are dissected up, and exhibited to the eye, and fastened in the memory as so many white cords or threads constituting the nervous system in its distribution through the body. The spinal nerve is looked upon as a fibrous rope-like cord in larger bundle than the other nerves, and all together reeled off from the brain as a great coil or knot of nerve tissue housed in the cranium for general supply.

Drop now this mere mechanical and constructive idea of the nervous system, and look at it from the ganglionic stand-point. Writers on the subject direct our attention to the brain as a great ganglion, composed chiefly of ganglionic tissue. Then attention is turned to the spinal cord as the long ganglion, and to the great sympathetic nerve as composed of a chain of ganglia in close proximity to one another and connected together by commissures of nerve-cord or bands. Looking into the viscera we find numerous ganglia linked to the great great chain of ganglia composing the sympathetic system, and located at convenient points to give functional action to the different organs and to respond to excitations and impressions made upon innumerable capillary nerves which each ganglion sends out to the periphery of the organ over which it presides. It is seen, therefore, to be a nerve-centre towards which all peripheral nerves within its area of supply converge. In pathology nothing is talked of more than reflex nerve-action, which derives all its meaning from the wide distribution and functional activity of ganglia. They are the centres of pain as well as of nerve-force. Various diseases and disorders are traced from these centres where the pain is located

to some peripheral region where the disease is located. The common mode of conceiving of the nervous system is like the attempt to gain an idea of the great telegraphic system of America by looking at the multitude of wires stretched throughout a large city and extending from city to city, without going into the offices where are kept the batteries, the wire-coiled magnets, and the clicking telegraphic machinery ; these are the *ganglia* of the telegraphic system.

The office is a telegraphic centre of a system of diverging wires. Wherever you find a cluster of wires stretched over your head and converging toward some central point, you may know that at the point of convergence there is a battery. So wherever you find a multitude of nerve fibres converging toward a common centre, you may know that at that point of convergence there is a ganglion.

This is the law of construction of the nervous system, and it is in every sense politic and economic. While the brain is the great metropolis of the system, supplying life and energy to the whole body, a large amount of the distributing work is done by the ganglia.

The nervous system is like the great traffic system of America. The business life and energy of the country are centred in New York City, and concentrated also in other widely separated business centres under the control of the New York markets. There must be distributing points for both money and commodities. Cities are the ganglia of the traffic system ; ganglia in the human system are as much a fixed necessity as cities in the development and growth of a country. As in Italy all roads lead to Rome so all nerves lead to a ganglia as a common centre.

DENTAL ANOMALY.—On July 9, 1886, Dr. Adams, of Bristol Pa, administered gas to a farmer, aged 45, to remove the left superior second molar. Upon loosening it an unusual obstruction occurred, he dissected the gum from the partially extracted tooth, and at last brought away the mass, which proved to be two teeth with a portion of the alveolar process. Upon becoming quite dry the teeth separated, and the union was found to be merely pericemental in connection with that portion of process adjacent to both teeth.

British Journal of Dental Science.

LONDON, AUGUST 15th, 1889.

THE SOCIETY MEETINGS.

THERE are many men who from inexperience or want of personal contact with others better acquainted with the advantages to be obtained from professional gatherings, decry as useless and tiresome the meetings of Dental Societies. There are others who have the temerity to assume that they know so much about their profession, so much more—we might say—that to them the instruction to be derived from meeting other dentists is “Caviare to the million.” Both these classes of men make a great mistake, and a mistake by which they themselves are the chief losers. The societies which are devoted to the science of dentistry in the United Kingdoms are far too few and too exclusive in their scope, and mainly is this due to the fact that English dentists have yet to be cultivated up to society work. Few understand the advantages of recording cases of interest, of trying new methods, and still less do they possess the readiness in debate, and clearness and precision in argument which constitute a good speaker. In this connection we may point out how valuable are the various “Students’ Societies,” which enable the novices to learn methods of debate, and acquire readiness of reply as well as an opportunity of conquering the painful “Eh—eh—eh,” stage of public speaking, which is so peculiarly objectionable to the unlucky wites whose sad fate it is to be “listeners.” The man who believes himself “Sir Oracle,” on dental matters, who slaps you on the back and says he could “teach the lot

of 'em," commits a great error. All of us have our methods, and most of us think *our* method is the best, but this self assertiveness does not by any means prove that "brag" although a good dog is yet a better dog than all others, and even he may be preferable when muzzled. The merit of bringing our own methods to the test of open discussion lies in the fact that however well a man may know his own business in any good society of fellow professionals he is sure to come across others who look at things from an entirely new point of view, and who must, save to the stupidly pig-headed, let in side light, suggest improvements, or point out limitations in practice. Again, emulation is no small advantage to a man, and if he finds, as he undoubtedly will, when he visits societies, that other men use other methods, that he is old-fashioned or behind the times in many ways, he will adopt fresh departures into his practice and strive to be as much to the front as his peers. In practice, a man is apt to smother his failures, and seems only too pleased if they escape observation. If, however, a man is wise, he remembers the saying that "we learn more by our failures than by our successes," and seeks in every case of partial failure, or downright *fasco* to determine in what way he went wrong. And here is it that Societies come in usefully. He goes to this or that meeting and tells his case, the quidnuncs, of whom every professional gathering must furnish examples, will laugh in their sleeves and giggle as is the nature of their kind, but the earnest men, the men of ripe experience will declare their own failures and indicate how the false steps in the method can be avoided. The man who avers he never fails is too good for this world, he is either mendacious or a fool of most limited experience, and not infrequently is he both.

The value, too, of Societies is nowadays happily enhanced by the introduction of demonstrations. These are really invaluable. They should be more and more extended, and made more thorough, for their usefulness cannot be estimated at too high a price.

This year there are many foreigners in this country who

may tell us of our mistakes and point out how far better may be other and foreign plans less familiar to us. Let us all, then, get to the meeting of societies if such exist in our neighbourhood, and invite any interesting foreigner whom we may know, and bid him discourse. The more who attend the meetings the better. As will be seen by reference to another column, various important meetings are announced for this autumn and next year, while in Paris at the present time noteworthy congresses are taking place.

THE EFFECT OF DENTAL PLATES ON THE BUCCAL MUCOUS MEMBRANE.—Dr. Langsluth, of the Pennsylvania Hospital, draws attention to what he believes is a danger to be realised by wearers of dental plates, viz., the tendency the plates induce to deaden the sensation possessed by the mucous membrane of the mouth. He finds that when this condition has been brought about, there is a fear lest corrosive, or over hot materials be taken into the mouth, and so grave inconvenience, if not danger arise without the person's receiving by the mucous membrane the usual premonitory sensations.

THE meeting of the British Dental Association takes place at Brighton, on August 21st, and following days.

THE DEATH OF JAMES SPENCE BATE, F.R.S., will be deplored throughout the profession. Besides taking an active and useful part in dental politics and dental progress, he did no small amount by his example and excellent work to gain for dentistry recognition among scientists and fellows of the Royal Society.

HOW MANY TEETH MAKE A BITE.—This pertinent question is asked and answered as follows in our contemporary *The Lancet*. In a scuffle, A was bitten by B on the arm. A asked me to examine his arm. I found four teeth marks of

one jaw over the deltoid muscle, but no mark over the other jaw. I was followed into the witness box by another practitioner, who swore that it was a physical impossibility for B to bite, as he had no upper teeth. I saw B's mouth afterwards, and found that he had a full set of teeth in the lower jaw, with the exception of one of the lateral incisors gone, the others coming together to partly fill up the vacancy, and so causing the teeth to be rather widely separated, which corresponded exactly with the marks on A's arm. There was only one tooth in the upper jaw in front—viz., a lateral incisor which had been loose for years. My opinion is that the loose tooth would give, and the jaw would impinge against the arm, while the lower teeth would cause the mark, described. Is it a physical impossibility, for B to bite? A had his coat on when the affair occurred. To this *The Lancet* says:—Where all the teeth are lost in the upper jaw the lower teeth almost invariably bite against the gum, and this may from use in mastication become hard and dense, just like the upper gum of ruminants, in whom the upper incisors are normally absent. There is nothing strange therefore in severe injury resulting from the bite of such a person. The presence of the one incisor would make but little difference, but would be rather in the way than otherwise. This is no unimportant matter from the point of view of Dental legal medicine.

ROOT FILLING WITH COTTON.—Mr. E. W. Stevens is not an enthusiastic admirer of cotton wool, when that material is employed for root filling. He has communicated his personal experience to the *Western Dental Journal*. His own words best express his not doubtful opinion of the practice of filling roots of teeth with cotton. "I carried some of that stuff around in one of my roots for six years, and when the tooth was finally extracted and sawed in two, I found the cotton all there, and it had gained both in size and weight, and was more odoriferous. People coming into my office for the next

few days said I had a morbid taste for animal pets. But to answer the question. I should say "no." I have known many pulp-canals to do good service simply filled with nothing, and disturb not his slumbers—mine never rested easy. "In narrow lateral incisors, is the extirpation of the pulp justifiable to insure stability of the filling?" I should say "yes" in the majority of cases. In my experience there has been more difficulty in saving a live pulp in them than in any other teeth—*i.e.*, the upper ones. We may perform the operation of filling in good shape and all goes merrily on for a few months, or even years, but when the returning patient brings back an abscess, or gives in his experience of how he had to have it treated, etc., then you wish you had commenced at the beginning.

FOR AFTER-PAIN FOLLOWING EXTRACTIONS.—In an American exchange, Dr. Staples gives a hint which may be new to some of us. Immediately after extracting teeth, and while the pain is severest, he puts a thumb and finger on each side of the process and presses hard gradually for a minute or so, which forces the parts to the proper position, and this relieves the tension on the gums, and in a majority of cases prevents a dull uneasy feeling, and sometimes pain more severe than that for which the tooth or teeth were extracted, and which he has known to last for three weeks and even longer. Like a great many little things (yet good ones) in the practice, this one is neglected, and one who has never resorted to the practice has no appreciation of the benefits to be derived from it by his patients, especially is it useful when the pains come on, or persist for some days after extraction.

FILLING TEETH WITH SECTIONS OF GOLD,—DR. C. A. LAND, of Detroit, claims as his invention, says the *Dental Advertiser*—the method of filling teeth with sections of gold: "By burnishing platina foil into the cavity of a tooth to secure an impression, and then, by means of a blow-pipe, fusing gold

or any other suitable substance into the matrix to solid section in plug, and then securing the plug into the cavity by means of amalgam or any suitable cement or gutta-percha."

A RARE COMPLICATION OF TOOTH EXTRACTION.—Mr. T. E. Constant, a late House Surgeon at the Dental Hospital of London, records the following in the *Dental Record*.—G. P., aged 33, a police inspector, came to the Dental Hospital complaining of toothache, and referring the pain to the right lower wisdom. On examination, the tooth was found to be dead, with acute periostitis. The gums, in its immediate neighbourhood, were inflamed, but there was no evidences of suppuration having occurred, although it seemed imminent. Extraction of the tooth was decided upon. Gas was administered and an attempt made to "elevate" the tooth. The anterior root was dislodged, and, thinking it was in the mouth, the dresser ceased operating to remove it. It was then found to be lying *beneath* the mucous membrane at a point below its original situation, where the mucous membrane was reflected from the side of the jaw on to the floor of the mouth. Attempts were then made to extract it through the alveolus it formerly occupied, but they only tended to push it further towards the middle line. It was therefore extracted by cutting down upon it through the mucous membrane. The posterior root was then extracted with forceps. The case is interesting from its extreme rarity. Had the stump been overlooked in its new situation, and had it set up trouble for which the patient sought the aid of a general practitioner (the "medical man" who advises his patients to poultice alveolar abscess on the outside), what his diagnosis would be and what surgical atrocity might result is painful to speculate upon.

Manipulative Miscellany.

All new instruments or articles wished to be described under this heading are requested to be sent *for inspection* to the publisher not later than the 8th and 23rd of each month, they can be returned in a few days. Where, from the size or otherwise, this is impracticable, a clear and minute description will be sufficient; the sole object being, to give practitioners a description of everything new, on its own merits, and without any intention or wish to put one against another. All makers, vendors, and inventors, are invited, with strict impartiality, to contribute towards this end.

MR. LEMAN'S IMPROVED SUCTION VALVE.

THERE have been many attempts made at different periods since suction plates were first used, to produce some reliable method whereby to secure the sustaining power for upper plates which, without extraordinary means cannot be made to stay up. It is satisfactory in this confined portion of our work to notice the very real progress which has been made, from the flat and objectionable rubber disc to the neat and small valves produced by Leman and others.

The present improvement in Leman's valves which we notice to-day is another step in the forward path. Both the valve centre and the case have been improved, the former being composed of a material which is claimed to be durable; The case presents a smooth surface to the tongue: in bulk is a little less in diameter than a threepenny-piece, and slightly thicker. The whole is without doubt about the neatest and most compact arrangement for the purpose which we have noticed, and contains condensed in that small space capabilities which many will be glad to test practically on some of the awkward cases which are occasionally met with.

The figures will elucidate the principle and construction of the valve. It will be at once seen that it is simple and efficient and does credit to the inventor.

Fig. 3.



Fig. 2.



Fig. 1.

Fig. 1 shows the interior of the valve case with the raised annular valve seat upon which the flexible centre rests.

Fig. 3 represents the flexible centre.

Fig. 2 represents the cover of the valve upon the outside edge of which a screw thread is cut ; a corresponding thread is also cut upon the inside of the valve case, Fig. 1, and by a nice arrangement of the screw cutting, when the cover is screwed tightly into the outer case it becomes completely locked in position leaving just sufficient room for the free movement of the flexible centre between the valve seat and the cover.



Fig. 4.

Fig. 4 represents the lingual surface of the valve fixed in position in a vulcanite denture.

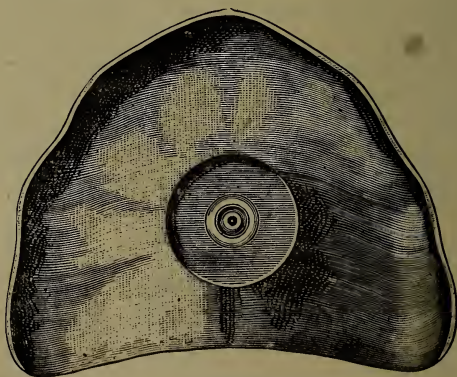


Fig. 5.

Fig. 5 is a palatal or back view of the valve and the air-chamber.

The two holes in cover or lingual surface of the valve, answer a double purpose, namely, a passage through which to exhaust the air from the air-chamber, and also for unscrewing.



Fig. 6.

Fig. 6 is a key for that purpose.

RESTORATION AFTER FACIAL DISFIGUREMENT CAUSED BY DISEASE.—Many will remember some beautiful pieces of workmanship—artificial ears and noses made in celluloid—which Mr. Boyd Wallis showed before the Odontological Society of Great Britain, during the session just completed. Dr. Charles Richardson, of Fayetteville, has made some successful experiments in the restoration of noses. In one case the integument had collapsed and almost entirely closed the nasal passages, making breathing very difficult, materially affecting speech, and presenting a very unsightly appearance. Dr. Richardson, after carefully trimming the hairs from the inside of the nose succeeded, with difficulty, in taking a correct impression of the inside of the nose. The remaining muscles being considerably contracted, the greatest difficulty was to hold the integument to the proper degree of extension until the impression compound had set. The impression was, of course, solid, and carved out to represent as nearly as possible the anterior view of the nares. After investing, he packed with the best English pink rubber and vulcanised for an hour. After the necessary polishing and trimming, it was placed in position, and proved not only comfortable, but greatly improved the speech.

Abstracts of British & Foreign Journals.

NEW YORK DENTAL COLLEGE RECORD.

CROWN AND BRIDGE WORK.

By J. MARION EDMUNDS.

THE cases suitable for the inserting of artificial crowns and bridge teeth, must be selected with caution and scientific skill. Many roots cannot be utilized as a means of support. If the root can be crowned, made perfectly inoffensive, comfortable, serviceable and durable to the patient then the operation is permissible. A pulpless root that is greatly denuded by absorption of the surrounding alveolus, much softened, or very loose from extended destructive inflammation of the investing membranes cannot be used. Impaired crowns, only partially broken down, with the pulp intact, the investing membrane free from disease, the cervical portion of alveolus and cementum unimpaired by decay, and firmly attached to the socket are applicable. Between these two extremes are gradations of normal and abnormal stages which may be operated upon, but the ultimate success of the operation will be more or less impaired, according to the condition of the root, and surrounding parts at the time of operating. All promises as to success should be based on a careful examination of the roots and surrounding parts. Any deviation from this method, excluding a recognition of these facts is unreliable. The results will not only be governed by the immediate condition of the mouth. Any abnormal state of the hard or soft tissues will determine unfavourable conditions. Whenever a root that has previously been treated for chronic abscess, is selected to be operated upon, the writer advises to open the pulp canal, completely fill it with cotton, the first piece having been saturated with a solution of chloride of zinc. This plugging of cotton should remain four or five days before crowning the root. If there is any inflammation of the gums around the teeth remaining, or if any are carious, appropriate treatment should be at once directed to them. Where a root or tooth has been restored to a normal condition, or where an inflammatory diathesis exists the greatest caution should be

used to avoid all unnecessary irritation. Irritation may be excited by files, saws, tapping of the mallet, slipping of corundum discs, the use of excising forceps, scalers, trimmers and most surely by cutting the root below the margin of the gum. If loosening or tenderness of the root should take place, before setting the crown, it is best to defer the operation until all irritation or inflammation has subsided. Suppuration is liable to follow irritation, then the removal of the crown becomes necessary, followed by a course of treatment and much annoyance to the patient. Thus in cases where the remaining portion of a crown is improperly dressed with either a corundum disc, or any other instrument ; or where the portion of a crown is left projecting, and the cap is made to fit it, in its ill shape. It will then project over and encroach upon the festoon of the gum, setting up a dangerous inflammation. If in this case the crown had been properly dressed, slightly conical in shape, from the neck of the tooth to the articulating surface, and a closely fitting cap made to fit accurately around the neck of the tooth, the result would be perfect. In the former case the result would be a miserable failure. Occlusion is all important. If a crown is improperly set, there will be an injurious strain upon it. This may be by lateral pressure or direct antagonism, sometimes both, resulting in destructive inflammation, great distress to the patient, and the ultimate loss of the tooth. Patients are not competent to judge either of the occlusion or adaptability of a crown in any case. The patient is not to be trusted about the condition after crowning. If a living pulp remains in the root, the best and surest mode of operating is to cut, with a small corundum disc, a niche on the labial and palatal surfaces near the margin of the gum. Then at once nip the crown or portion of crown off, with the excising forceps. The operation of nipping the crown in this way is generally painless ; when pain is felt, it is very slight. To remove the pulp without pain he advises to apply to the wounded pulp a solution of chloroform and cocaine, five grains of hydrochlorate of cocaine, to one dram of chloroform. This solution must be applied directly to the bleeding pulp and renewed as often as necessary until the pulp is insensible to the point of the hypodermic needle. The needle may then be inserted into the pulp canal and three minims of ten per cent. solution of hydrochlorate of cocaine injected. From three to five minutes should be allowed for the action of the cocaine before extir-

pating the pulp. As soon as the bleeding has ceased, the canal may be enlarged and sealed with liquid gutta-percha and a few fibres of cotton. Arsenic for developing pulps should never be used, as it only destroys the pulp, but the pericementum and all other vital connection of the root. The orange wood, plug he regards as barbarous. After the root has been prepared, the apical foramen sealed, the canal enlarged to receive the dowel pin, and the crown selected, the next important step is fitting the crown. The cervical portion of the root must be at least one sixteenth of an inch above the free margin of the gum to permit of proper shaping. The labial surface must first be ground to a bevel or semi-wedge shape, from the pulp canal to the margin of the gum. The dowel pin is then inserted and the crown or facing, ground to fit the ground surface of the root. The facing must then be backed with platinum foil and fastened to the dowel pin with hard wax. The formula is—white wax 8 oz., gum dammar 4 oz., resin 1 dram., melt the wax, then add the dammar, stir occasionally until all the dammar is dissolved, then add the resin. A half ferule of 22 K. plate is then made to fit the palatal surface of the root closely. This may also be attached with hard wax to the dowel pin. The entire structure can now be removed and is ready to imbed, in plaster of Paris and marble dust, pulverized pumice stone, sand or asbestos,—one part of plaster to two of either of the latter ingredients. There should be no sharp corners, or square edges on the half ferule; they must be removed forming a neat curve from the centre of the summit on the palatal surface, to the base at the point of union, on either side, with the porcelain face. The square edges must be bevelled very thin, and then burnished that no point of irritation remains. Neither must the ferule be inserted far beneath the free margin of the gum, or destructive inflammation of the periosteum will certainly ensue. It is necessary to try the crown, after it is finished, several times, pressing it well up to its place, noting every change in the colour of the tissue, and removing any encroaching materials with the file: then again polishing and burnishing it before inserting. It is always best to have the ferule extend as little as possible under the gum, and the part that does so extend should be thin and fit very closely to the root. Be cautious against cheap methods. First, because a crown that has been properly selected in size and colour, to corres-

pond with the natural teeth of either side accurately adapted to the absolute exclusion of all alimentary substances, is an invaluable operation to both patient and operator and cannot be accomplished without skilful manipulation the best and most desirable material.

Secondly, because cheaply constructed crowns that are made to fit by chance, take away from the operator his individuality and originality, therefore menace his manipulative ability and render him dependent upon the manufacturer, and unfit, when called upon to give the peculiar manipulative skill requisite of the practical and progressive dentist. Bridge work is the substitution of artificial crowns for carious roots or teeth which have been extracted, a process by which the intervening spaces are filled in with a number of artificial crowns joined together, and permanently fixed in the mouth by attachment to one or more of the natural teeth or roots. Bridge work is of two kinds, moveable and immovable. Both have excellent points, the moveable has, he thinks, somewhat the advantage in point of cleanliness, although there is no reason why, if due care is observed, that the permanently fixed work cannot be kept as clean as the natural teeth. To construct moveable bridge-work, the preparation of the teeth is most important. Special care must be taken that the tooth or root is slightly conical in shape from the neck to the grinding surface. Enough of the grinding surface is removed to permit the insertion of two caps. After the tooth has been shaped a strip of copper thirty-four U.S. standing gauge, a little wider than the tooth may be placed around the prepared tooth which may be tightly drawn into place with a pair of flat nose pliers. The copper is now removed and trimmed to the marks indicated by the pliers, which will give the requisite size of the gold plate to make the ferule or band. The next step is to force the ferule over the tooth, pressing and burnishing as necessary to properly adapt the ferule to the form of the tooth. When the ferule has reached the gum the encroachment of its square edges will be indicated by a change of colour in the tissue from pink to white. Now mark the ferule with an excavator around the festoon of the gum. The ferule must now be removed and trimmed to where it is marked. The edges should be filed and burnished before replacing it. This process must be continued until every part of the tooth is neatly covered, and slightly extending under the free margin

of the gum. The edges must be bevelled and burnished so there are no rough irritating points or edges remaining. A neat impression may be taken by placing a small piece of wax on the grinding surface, pressing it firmly into place and allowing it to remain until cool. Then with a scaler or other suitable instrument remove the ferule and wax together. Run the ferule full of plaster and marble dust, cover it completely, except the wax which can be removed as soon as the plaster is set. After the wax is removed, make a paper pattern, by pressing a piece of paper over the imbedded ferrule, cutting it out as indicated by the impressed line. A piece of platinum foil is cut to this pattern and pressed into the open end of the ferrule, which may have sufficient 18 K. gold solder flown over it to make a cap. This completed, the cap is ready to be finished and cemented to the prepared tooth. Another cap is now to be made to telescope over the one in position. A ferrule first being made not quite extending to the gum. It must project at least one thirty-second of an inch above the surface. The patient closes his teeth upon the wax, thus securing an impression of the antagonising molars or bicuspid. From this impression run a plaster model which can be duplicated in sand, and cast in zinc, making a die to strike up the cusps, for the movable or outside ferrule. There are many advantages in making cusps in this way, from very thin 22 K. gold plate. After swaging the cusps and trimming them to fit the ferrule, 20 K. solder may be flown in the depression of the under side making them solid. The cusps are then to be soldered to the ferrule making a beautiful cap. One of the greatest advantages of this method of making cusps is that an operator can secure more perfect occlusion of the teeth than can be obtained in any other way. Because if the cusps are made from an impression of an antagonizing tooth, they are a facsimile of the natural organs, and will perfectly articulate with the same. The details of this operation must be followed out with other teeth selected for attachment. Supposing that two teeth, a right superior third molar, and a right superior first bicuspid, were capped and crowns made to telescope as above described, the crowns should be then placed over the caps, care being taken that proper occlusion had been obtained, an impression should be taken in the following manner:—mix the plaster to about the consistency of putty, pack this well around the crown and fill the spaces between them well.

Now have the patient close the mouth, observing that the proper articulation has been secured. By these means the bite and impression is taken at the same time. After the plaster has set, request the patient to open the mouth which will generally break the impression. This is most always done. The pieces are then laid carefully aside until dry, when they may be put together with silex or wax at the option of the operator. —The impression should now be varnished with shellac varnish, the formula is—(gum shellac 3 oz., alcohol one pint.) This makes a thick varnish, which is well adapted to this work. As the impression is now put together with gold crowns imbedded in it and varnished, the next step is to place it in the articulator, mixing the plaster medium and filling both sides at once which makes an excellent model to work on. Next grind and fit the selected crowns to the model. Also grind the cusps off leaving a flat surface, and back them with platinum foil, allowing the foil to extend over the flat surface of the crown about one eighth of an inch. Now wax these to the gold crowns with hard wax, and place the gold cusps, made in the manner described in proper position, over the porcelain facings, in such a manner as to secure perfect occlusion between the gold cusps and the cusps of the natural teeth. This being completed, the piece may be removed from the articulator, and imbedded in a matrix, made by mixing one part of plaster to two parts of marble dust. Then as soon as this sets, the wax can be removed and the matrix filled with 20 K. solder and covered with a piece of charcoal, that it may cool slowly. After it is cooled it is ready for finishing and insertion. The advantages of this method will be readily appreciated by those who take into consideration the cleanliness of accessibility of the piece in case of accident when repair is needed. A case is cited of a lady whose mouth was in a bad condition of ulceration, caused by a badly constructed rubber plate which was neither useful or ornamental. There were only two superior third molars remaining in the arch; these were loose and the alveolus was in a state of suppuration. It was decided to try and save the teeth, and replace the entire denture. After two weeks treatment the two teeth were prepared and capped after which gold crowns were made to telescope over the caps; a die and counterdie were made, swaged a rim 22 K. gold plate, 28 U.S. gauge in thickness by $\frac{3}{8}$ of an inch in width to fit the arch. Placing this in the mouth and telescoping the crowns in their places he secured a second im-

pression and bite, which was placed in the articulator. After trimming and varnishing, the impression was removed by piece-meal, and countersunk teeth, waxed to the rim and crowns. These he removed from the articulator placed in a flask and vulcanized in the usual manner, using pink rubber to attach the teeth to the gold rims and crowns.

Dental News.

OBITUARY.

CHARLES SPENCE BATE, F.R.S. L.D.S.

After a brief illness this illustrious member of the dental profession departed to his rest. Descended from an old Plymouth family and the son of a dentist, well known and respected, Mr. Spence Bate joined his father in practice and rapidly gained as great a reputation as his father. Mr. Spence Bate sought recreation in the observation of nature and his work written in conjunction with Mr. Westwood, upon Sessile-eyed Crustaceans won for its author the fellowship of the Royal Society. This work was followed up by others dealing with other aspects of this subkingdom of invertebrates and earned for him the position of being perhaps the greatest authority upon these curious creatures. Mr. Spence Bate's scientific work was thoroughly and carefully executed and he was very highly esteemed among his fellow scientists. At the International Congress of 1881 Mr. Spence Bate held the honourable post of Vice President of the XII Section, he was President of the British Dental Association in 1883 and of the Odontological Society in 1885. His pen has furnished many valuable papers on dental subjects both in our columns and elsewhere.

THE INQUEST.

An inquest was held at Brent July 31 the body of Mr. Charles Spence Bate, F.R.S., who died at his residence, Rock, on the preceding Monday afternoon. Great surprise was expressed that an inquest was regarded as necessary, seeing that deceased had been attended in his illness by more than one medi-

cal gentleman, and that Dr. Hingston was quite prepared to certify that death had resulted from natural causes. In some unaccountable manner a rumour was abroad in the village that the deceased died from poisoning, and it is believed that the police communicated with Mr. S. Hacker, one of the county coroners, who, in the exercise of his discretion, directed that an inquiry should be held.

The first witness was the widow, who stated that her husband had lived at Rock for about two years. She had known Mr. Bate for about 15 years and was married to him two years next October. When she married him he was a hale man, but he complained of internal pains, which he ascribed to gravel. For about two months Dr. Hele Bate, her husband's son, and his wife, had been visiting at Rock, and for about three weeks Miss McKechnie had also been a visitor. Last year deceased began to fail in health, and he would get up after dinner and complain of pains. During the last three weeks he became worse. He was averse to calling in a doctor; he disliked medical attendance. Three weeks ago, however, he went to Dr. Hingston's and complained of weakness and said he felt very tired. Dr. Hingston prescribed and told him to rest all he could. Dr. Hingston attended him until he died. Witness was present almost up to the time her husband died. Mr. Connell Whipple, surgeon, was also present. At first he appeared to get better; then suddenly he became worse, and during the last three days suffered acute pain. The instructions of Dr. Hingston were carried out under the direction of Dr. Hele Bate, deceased's son. She, deceased's daughter, and deceased's daughter-in-law, Mrs. Hele Bate, nursed him. During the last three days he suffered very much from vomiting. The Thursday night he vomited every half hour. On Sunday he never ceased vomiting, and laudanum was given him. He took nothing but brandy, except milk in which powder was placed so as to make it digest more easily. Deceased was quite sensible and talked to her and to Mrs. Hele Bate. On Monday Mr. John Shelly, solicitor, of Plymouth, was present, and made deceased's will, she and the Rev. W. T. Cole, the vicar, being the only persons present. She had no reason to attribute death to anything but natural causes.—In reply to Mr. C. H. Bennett, of Devonport, who represented the family of deceased, witness said she had never said or written anything to lead anyone to suppose that she believed her husband died

from other than natural causes. Dr. Hingston deposed that Mr. Spence Bate first called to see him on July 8th, when he complained of pains in the intestines. He prescribed, and told him to go home and rest. On 15th July he received a letter from Mrs. Spence Bate saying she was not satisfied with the progress he was making, and asking him to hold himself in readiness for a telegram. The telegram came, and he went to Rock and saw deceased. On Wednesday he told him of his danger, and suggested that a trained nurse should be engaged, but deceased said he had every confidence in his wife and daughter, and preferred that they should wait upon him. Deceased undoubtedly died of intestinal obstruction, but the nature of the obstruction could only be ascertained by a post-mortem examination. Vomiting was quite consistent with the malady, and he discussed it with deceased, who was a man of high scientific attainments.—In reply to Mr. Bennett, witness said he telegraphed to him (Mr. Bennett) that he was quite prepared to certify that deceased died of intestinal obstruction, after 20 days' exhaustion.

A juror asked at whose instigation the inquest was held.—The coroner said that, having received certain information, he, in the exercise of his discretion, directed the holding of an inquest, believing that it was in the interest of all parties that it should be held.

Mr. Johnson, surgeon, stated that by the orders of the coroner, and assisted by Mr. Raby, of Ivybridge, he made a post-mortem examination. The intestines were very much diseased. There was about a gallon and a half of effusion, the result of obstruction, and there was a collection of about 30 gall stones about the size of peas. The immediate cause of death was obstruction of the bowels caused by a malignant cancer. The wonder was that deceased lived so long. There was no sign of unnatural irritation in the stomach, and death was entirely due to natural causes.—Mr. Raby gave corroborative evidence.

Dr. Hingston, who had not previously heard of the result of the post-mortem examination, remarked that it absolutely confirmed his opinion as to the cause of death.

A Juror thought it was unnecessary to have had an inquest. (Hear, hear.)

The Coroner having observed that there was nothing in the evidence to call for remark from him, the jury without retiring immediately returned a verdict of "Death from natural causes."

DENTAL CONFERENCE.

MEETING OF AUCKLAND DENTISTS.

A MEETING of dentists was held on May 31st at the rooms of Messrs. Sharland, when the following gentlemen were present: Messrs. E. Cox, Windsor, H. Cox, Carter, Smith, Hill, Loneragan. Several others were absent, owing to inclemency of the weather. Mr. E. Cox was voted to the chair, and Dr. H. Cox was requested to act as secretary.

The following resolutions were unanimously adopted :

1. That Mr. Rawson, of Wellington, be requested to act as the representative of the Auckland dentists at the forthcoming dental conference.

2. That this meeting regards the arrangement for a dental conference at Wellington with satisfaction, and is of opinion that the formation of a New Zealand Dental Association is desirable.

3. That in the opinion of this meeting, the objects of the above Association (if formed) should be : (a) The revision and' as far as may be deemed necessary, the amendment of the Dentists, Act ; (b) to maintain the spirit and provisions of that Act ; (c) the promotion of unity, fraternity, and the elevation of the dental profession ; (d) to endeavour to raise the standard of the examination and curriculum for admission to the New Zealand Dentists' Register, and also to secure a Board of dental examiners for the North Island.

4. That a copy of the above resolutions be sent to our representative at Wellington.

A vote of thanks was unanimously accorded to the Chairman, and to Messrs. Sharland for the use of their room.

A further meeting is to be called after the replies received from Wellington.

THE INTERNATIONAL MEDICAL CONGRESS, 1890.

WE, the undersigned, do hereby give notice, that according to the resolution passed at the Washington meeting, Sept. 9th, 1887, the 10th International Medical Congress will be held in Berlin.

The Congress will be opened on the 4th, and closed on the 9th day of August, 1890.

Detailed information as to the order of proceedings will be issued after the meeting of the delegates of the German Medical Faculties and Medical Societies at Heidelberg on the 17th of September in the current year.

Meanwhile, we should feel sincerely obliged, if you would kindly make this communication known among your medical circles, and add in the same time our cordial invitation to the Congress.

Von Bergmann, Virchow, Waldeyer.

PICNIC OF MANCHESTER DENTAL STUDENTS.

THE annual picnic of past and present students was made on Thursday, July 11th. The party left the Dental Hospital guided by Mr. Linnell, the House Surgeon, by stage coach to Warrington, here Mr. Fletcher conducted the party over his extensive works, showing and explaining his various gas appliances, the easy manner with which he melted down gold with his powerful blow-pipes was watched with great interest and astonishment, $\frac{1}{4}$ in. wrought iron yielding with similar rapidity to their power. Being hospitably welcomed to his house, the party viewed the gas appliances with which it is fitted,

At Lymm, a section of the Manchester Ship Canal was visited the gigantic digs of the steam-navvy being seen. Dinner was then partaken of at the Plough Inn, and after a little music had whiled away the evening the party returned by coach, having spent a most enjoyable day.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

At the July sittings of the Dental Board the following gentleman were admitted licentiates in Dental Surgery :—

Mr. J. Royal, Weymouth ; Frank P. Nattrass, Nottingham ; William Wallace, M.A., M.B., C.M., Glasgow ; Augustus Berkley, Brighton ; John G. Biggs, Glasgow ; William Geikie, Oxford.

EDINBURGH DENTAL HOSPITAL AND SCHOOL.

THE presentation of prizes in connection with the Edinburgh Dental Hospital and School was held recently at No. 5 Lauriston Lane—Dr. Joseph Bell, president of the Royal College of Surgeons, presiding. The report for session 1888-9 having been read by Mr. W. Bowman Macleod, L.D.S. the Dean commented in the outset on the success which continued to accompany the Dental School since its migration to the premises in Lauriston Lane—premises which after three months' trial were found to be excellently well adapted for the purpose in view. The senior prize for hospital practice had been won by Mr. Fred J. Bounalie, Mr. Douglas. Shepherd taking second place and a certificate; whilst in the junior division Mr. John T. Jamieson had secured the medal, and Mr. Murray Thomson the second place and a certificate. For the systematic courses the prize-takers were:—Dental anatomy and physiology, Alfred Donagan; dental surgery and pathology, first, J. D. Watt, and second, L. S. Shennan; and dental mechanics, Andrew K. Brittain. In addressing the students after the presentation ceremony, Dr. Bell propounded a theory for making the dentist a specialist—making him a medical man first, and a dentist afterwards. His idea was they should in some way affiliate the L.D.S.'s to the College of Surgeons, by giving them a modified licence of the College from which they might go forward, and by examination become fellows of the College.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

EXAMINATION QUESTIONS.

THE following questions were set for the last Examination for the Diploma in Dental Surgery on May 6th, 1889:—

ANATOMY AND PHYSIOLOGY.

1. Describe the parts concerned in the operation for Closure of a complete Cleft of the Hard and the Soft Palate.
2. Describe the entire course and distribution of the Lingual Artery.

SURGERY AND PATHOLOGY.

3. Describe the process of repair of a Fracture of the Lower Jaw. Give the treatment you would adopt in thi

accident. (The fracture is supposed to be between the first molar and bicuspid teeth.)

4 Describe the various forms of "Closure of the Jaws," and give their appropriate treatment.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Describe the attachments of a human tooth. Mention other varieties of implantation in sockets, and enumerate, with examples, other methods of attachment.

2. Describe the changes by which space is provided for the permanent Incisors, Canines, Bicuspids, and Molars respectively. At what ages are their roots severally completed?

3. What is meant by (i) Brown Striæ of Retzius ; (ii) Sharpey's fibres ; (iii) Interglobular spaces ; (iv) Lines of Schreger ; (v) Bunodont, Acrodont, Selenodont.

DENTAL SURGERY AND PATHOLOGY.

1. Discuss fully the operation of Torsion of Teeth, and state how you would employ Cocaine for such an operation.

2. Enumerate the drugs which have a harmful effect upon the Teeth or the Gums. Describe the effects produced and their treatment.

3. Describe a Kingsley and a Suersen Obturator.

How would you take the impression, and what conditions must be observed in order to satisfactorily vulcanise velum rubber.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

During the July sittings of the examiners, the following gentleman passed the first professional examination for the license in dental surgery :

John M'Laren Mason, Edinburgh, and Arthur Sherwood Anderson, Edinburgh ; and the following gentlemen passed the final examination, and were admitted L.D.S., Edinburgh : Charles William Stuart Wilde, Liverpool ; Thomas Gregory, Edinburgh ; William Graham Campbell, Dundee ; Charles Henry Jamer Acret, Canada ; John Henry Cormack, Edinburgh ; James Seymour Allen, Ripley ; Walter Graham Routledge, Exeter ; Alfred Elliott Smith, Norwich ; Dawson Storrow Shennan, Houghton-le-Spring ; and Frederick Leonard Floyd Masters, Huddersfield.

APPOINTMENT.

G. S. Wardill, L.D.S., has been appointed Dental Surgeon to the Luton Friendly Societies' Medical Institute.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

To the Editor of the "British Journal of Dental Science."

July 19th, 1889.

SIR,—Having read the article signed "Charles Audley" in a recent issue of this Journal, I thought that a few disclosures of the same nature, from the West Riding of Yorkshire, might go to show that much the same state of things prevailed here, and doubtless in other parts of the country, as in Lancashire, and also to keep the stone rolling. At the time the Register was taken there does not seem to have been a very careful attention paid as to whether persons claiming to be placed on the Register had any right to do so at all. Within a very small area here we have persons on {the register, and practising as dentists, and at the same time carrying on other trades; besides a person who saw that he could get on the register, and thus have Dentistry to fall back on whenever it pleased him to do so, but although he has not begun to practise, yet he retains the certificate.

To add to these are persons either practising without certificates, and even defying the law by attaching "Dentist" to their names. Besides those using other men's names for whom they have not worked an hour.

Again, I am told on *very good* authority of one person who has got his name placed on the Dental Register during the present year (1889). As to advertising I can make out that in a great measure our dentists are obliged to advertise in order to keep abreast with the puffing fraternity.

A worse thing than advertising is, persons taking a district and making a house-to-house search for work, or if they see a person in the street who seems as if a set of artificial teeth would improve their appearance will even set to and follow them home, or accost them and ask permission to supply them. Now this state of things is very discouraging to young men who are desirous of obtaining a diploma, because these upstarts are gaining at least two years practise, besides avoiding the trouble and expense of passing through a Dental College.

There is one plan by which a large number might be forced to abandon their occupations and that is by the refusal of the Dental Depots to supply any

but qualified persons—of course in order to make the plan effective it would have to be very rigorously applied. The best plan is through the General Medical Council, and the sooner some plan is adopted, the better for the profession, and the public generally.

It will be evident to all that we can scarcely expect dentists to tackle illegal opponents in their own districts, for by doing so they would bring down the disgust of the public, who are generally ignorant of the Dental Act, on themselves.

Doubtless there are many sufferers from this sort of thing, and may be some kind of combination would do good.

Yours respectfully,

A DENTAL STUDENT.

REMOVABLE BRIDGEWORK.

To the Editor of "The British Journal of Dental Science."

PENGAM, July 27th, 1889.

SIR,—IN your issue for the 15th July I notice an article by Mr. Councell suggesting an improvement on the removable bridgework I have designed and introduced to the profession for about two years. The models he mentions were, I presume, some that Mr. Harding, of Shrewsbury, kindly asked me to send him to show at the Liverpool meeting. Mr. Councell suggests fitting a screw to the saddle for securing it to the bar. I have found a thick solution of gutta percha to answer better, as it excludes the secretions of the mouth from the slot in the saddle. If he removes one of his pieces when he has used a screw only he will find the odour anything but agreeable. Instead of a solution of Chlor. G. P., a strip of low heat G. P. filling may be placed in the slot or saddle which is then heated over a spirit lamp. The bar also is heated by grasping with hot pliers. The saddle can then be pressed over the bar squeezing out the surplus G. P. To remove the saddle or bridge it may be heated with a hot air syringe, or grasped in a hot pair of pliers.

The method I prefer in making the saddle is to fit the bar to the plaster model mound in sand and cast a babbitt metal die; from this I make female dies in compo for impressions. These will strike up a thin 28 or 30 gauge soft platina saddle in one piece assisted with a pair of pliers to make a close fit to the bar. The platina may extend over the ridge also as far as required.

Yours truly,

J. H. GARTRELL.

Hospital Reports.

MONTHLY STATEMENT of operations performed at the Dental Hospital of London, Leicester Square, from July 1st to July 31st, 1889 :—

Extractions	{ Adults	2000
	{ Children under 14	410
	{ Under Gas	867
Stoppings	{ Gold	345
	{ Plastic.	1186
Advice		127
Irregularities of the Teeth		106
Scaling, Pivots, and Dressings		304
Total		<u>5345</u>

J. P. SMITH,	}	<i>House Surgeons.</i>
T. E. CONSTANT,		
A. H. SMITH,		

Monthly Statement of operations performed at the National Dental Hospital, from June 1st to June 30th, 1889 :—

Number of patients attended	.	.	.	.	.	1852
Extractions	{	Children under 14	.	.	.	257
		Adults	.	.	.	448
		Under Nitrous Oxide	.	.	.	747
Gold Stoppings	.	.	.	.	.	112
Other Stoppings	.	.	.	.	.	399
Advice	.	.	.	.	.	403
Irregularities of the Teeth	.	.	.	.	.	136
Miscellaneous	.	.	.	.	.	136
Total	.	.	.	.	.	<u>2665</u>

E. C. FISK, L.D.S., Eng.,	}	<i>House Surgeons.</i>
W. S. KEEVIL,		

STATEMENT of operations performed at the National Dental Hospital, from July 1st to July 31st, 1889:—

Number of patients attended	1935
Extractions { Children under 14	240
{ Adults	450
{ Under Nitrous Oxide	891
Gold Stoppings	98
Other Stoppings	406
Advice and Scaling	414
Irregularities	119
Miscellaneous	112
Total	2730

E. C. FISK, }
G. M. KEEVIL, } *House Surgeons.*

Work done at the Victoria Dental Hospital of Manchester during the month of July 1889:—

Number of Patients attended	1159
Extractions { Children under 14	698
{ Adults	
{ Under Nitrous Oxide	134
Gold Stoppings	85
Other Stoppings	149
Miscellaneous	284
Total	1350

P. A. LINNELL, *House Surgeon.*

British Journal of Dental Science.

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NOTES ON NITROUS OXIDE

By J. OTTLEY ATKINSON, L.D.S., Eng.

THE following notes are intended as a supplemental addition to what has already been written by others rather than as a separate publication for which any special merit is claimed ; those who are likely to read these pages are presumed to be more or less acquainted with the history and manufacture of nitrous oxide, and to possess some experience in its administration, as well as in the daily routine of a dentist's surgery.

The manufacture of the gas has not been touched upon. Handbooks on the subject are easily procured by those who require their aid. Technical phrases, as far as possible, have been avoided.

Without invidiousness, the writer would direct the attention of his readers to the works of Dr. Dudley Buxton, and Dr. J. Frederick W. Silk, who have treated upon nitrous oxide exhaustively, and in a thoroughly practical spirit. With one or two exceptions there is hardly a sentence in either book that cannot be conscientiously endorsed by every intelligent anæsthetist.

The writer has nothing original to propose : he merely attempts to describe wherein his methods differ from those of other authorities, and if by so doing one practitioner is aided in obtaining more satisfactory results than he has hitherto been able to attain, the object of this contribution will have been achieved.

On its advent, as an anæsthetic, the writer had the honour of introducing nitrous oxide to his own county—Westmoreland.

The early history of nitrous oxide is tolerably well known, but remains of sufficient importance to justify a concise repeti-

tion of what may be regarded by some as an "oft-told tale." Nor would it be right that the names of men to whom the world is so deeply indebted should be passed over in silence. Priestley had the honour of its discovery in 1776. For the next twenty-four years it was chiefly heard of as a scientific plaything for the purpose of creating amusement at chemical and other lectures. In 1800, Sir Humphrey Davy was so well acquainted with it as to be aware of its anæsthetic properties. For the next forty-four years nitrous oxide for all practical purposes remained dormant. On the 11th December, 1844, Mr. Wells, a dentist, of Hartford, Connecticut, U.S.A. inhaled the gas, to which his attention had been drawn by Dr. Colton, while another dentist, Dr. Riggs, extracted one of his teeth painlessly. From that date commenced a new era in tooth drawing.

This briefly is the stereotyped history of Nitrous Oxide. Thenceforward its success became assured. Twenty-three years later, in 1867, Dr. Evans, of Paris, introduced the gas to London. Since which time it has steadily gained ground and become firmly established.

In its early years it was usual for each dentist to manufacture his own Nitrous Oxide, but this is no longer necessary. Gas, in its compressed state being supplied by the makers at a price which renders its manufacture unremunerative to all whose time is money. The purity and efficiency of Nitrous Oxide at the present day leaves nothing to be desired.

With some its age has become a moot question, and many whose judgement commands respect, contend that it ought to be freshly prepared; this is not the writer's experience. Equally good results have been obtained from gas that has been stored for a considerable length of time. The writer contributed a short note on this question to the *British Journal of Dental Science*, which can be found in the June number of 1874. The following is an abstract: "On May 12th, I administered the gas from a 100 gallon bottle of Coxeter's liquid Nitrous Oxide, which was last filled three years and seven days ago, viz., May 5th, 1871. The patient was a young lady, for whom I removed the two lower first permanent molars, and I never witnessed a more satisfactory case. This reported case was followed by numerous others equally satisfactory, the gas in some instances being five or more years old. This practically settled the question. The age of the gas would therefore seem hardly of the importance that some have attached to it.

There can be no difference of opinion of the suitability or otherwise of the gas for dental operations if we allow for ignorance, prejudice, and possibly, interest. The fact cannot be too strongly enforced that Nitrous Oxide gas, pure and simple, is *par excellence* the anæsthetic of the dental profession.

During an extensive practice of over thirty years the writer has not met with a case where the use of any other anæsthetic was either necessary or justifiable; there is no operation that a dental surgeon is likely to be called upon to perform that cannot be accomplished as well, if not better, under the influence of Nitrous Oxide than under any other known agent. This being the fact, to administer chloroform for dental purposes, except under very exceptional circumstances, is in the writer's opinion highly reprehensible.

With respect to the safety of the gas when in the hands of an experienced anæsthetist, (and no one else ought to exhibit it) there is little cause for apprehension. It would not be accurate to say that it is perfectly safe, yet out of the millions of administrations it is doubtful if one fatality can be brought directly home to the action of nitrous oxide. There are few patients in average health who may not place themselves under its influence with as much confidence and unconcern as is usually felt by an ordinary traveller when taking a journey by one of our best managed railways.

During a period extending from 1868 to 1884 the writer manufactured his own gas, which was supplied to his patients from a large receive conveniently placed behind the dental chair; this arrangement answered its purpose admirably. Since that date appliances of the most modern type have been exclusively adopted. The writer would here impress upon his readers the importance of having everything connected with the surgery wearing, as far as possible an air of innocent simplicity. Care being taken that the apparatus is of the simplest description and in the most perfect order. The face-piece, especially, receiving the closest inspection that the absolute exclusion of atmospheric air may be fully assured. This is of supreme importance. Of the various face-pieces in use the writer prefers Barth's Improved, as being the simplest and best. When fitted to the large india-rubber tube, attached to the bag with the smaller tube securely connected with the steel gas bottle, the apparatus is complete. This is the direct method and best adapted for private practice. In hospital practice other methods are thought preferable on the

score of economy. The question of suitable mouth props is also of considerable importance. Every known variety has been tried and found wanting ; none are free from objections, and all have been consigned to the limbo of antique curios. The acme in props is attained from ordinary corks ; an assortment ought always to be at hand. Inch-and-a-half beer bottle corks are found the most useful, but various sizes are indispensable to meet the requirements of special cases. The most valuable are extra long wine bottle corks—two-and-a-half inches—which can be fashioned with a sharp pen-knife in a few seconds to suit any case. A notch cut at either end can be readily formed to fit an edentulous gum. Cork has much to recommend it ; it is easily adjusted, does not slip or injure the mouth, is not likely to find its way into the larynx, and requires no fine gut or other attachment. As long wine bottle corks are cut from the finest and toughest cork there is no danger incurred from breakage. Perfect cleanliness is secured by destroying the cork after each case.

That there may be as little appearance of preparation as possible everything ought to be in its proper place, before introducing the patient to the surgery. Further than seeing that there is nothing tight about the neck no extra preparation is required. Examinations by medical men, in the main, are to be avoided, they tend to create alarm in the minds of the patient and do more harm than good ; our best authorities are opposed to them. Mr. Braine, and other authorities on the subject advise that a superficial examination should always be made, such as feeling the pulse, and ascertaining that the chest walls expand fairly well, by simply placing the hands on the chest, and directing the patient to take one or two deep inspirations ; but this is with a view to satisfy the patient, and to put one's self on the right side in the event of accident and consequent awkward questions that might be asked, rather than to obtain any very precise information for one's own guidance. Sir Joseph Lister, alluding more particularly to chloroform, but the opinion is if anything more applicable to nitrous oxide, maintains that even such examination is quite unnecessary, and, in fact tends to alarm the patient and raise suspicions in their minds which were previously non-existent. I think, then, that it may be laid down as a pretty safe rule that if the patients or friends suggest any doubt as to the former's fitness for being placed under the influence of the gas, or express even indirectly, by

word or sign (such as holding out the hand for the pulse to be felt) a wish for an examination, it is as well to adopt the superficial method suggested above, rather than attempt to overcome their scruples by argument, while, if definite lesions are known or suspected to exist, a more thorough and complete investigation should of course be made. Under other circumstances the less the equanimity of the patient is disturbed the better.

The welfare of the patient ought not to be disregarded in order that the surgeon or dentist may be protected against very remote contingencies.

The experienced eye of the dentist will take in the situation and recognize at a glance what ought to be done in each case. His assistants, two males and a female, all experienced and equal to every emergency, are now supposed to be at their respective posts. The operator, who is also administrator, having selected the forceps, and placed them unseen in the order required for the work to be done, in the left hand pocket of his waistcoat. The writer finds three pairs sufficient to meet the requirements of the most difficult cases. Elevators are not to be thought of. It must next be seen that the air pad of the face-piece is neither too hard blown, or the reverse before it is applied to the face of the patient and the gas turned on; from the moment this is done to the conclusion of the operation the utmost care and skill on the part of the dentist and his assistants becomes a *sine qua non*. The gas should be fully given until jactitation and other well-known symptoms warn him to desist, when the extractions commence. It would here take pages to describe what in practice can be demonstrated in a few seconds. Supplemental bags for reinhalation of the gas are not recommended; economy in this respect may mean failure.

The writer does not agree with those who assert, somewhat dogmatically, that the duties of administrator and operator ought never to be undertaken by the same person. The operator being best judge of his own wants will push the gas to a point with a near approach to precision to suit the requirements of the case. This division of duties might be safe advice during the earliest years of gas, when all were presumed to be equally inexperienced; but at the present time there are dental surgeons whose practical knowledge has taught them to disregard this arbitrary law with the most beneficial results. The duties may be, and frequently are so

combined, and this solely with a view to promote the best interests of the patient. In the writer's practice the division of duties is permitted only in those cases which present unusual complications. Long practice and a record of many thousand successful cases have carried him a long way in the direction of conviction that this method is worthy of some consideration, and all methods must be judged by results. The capable dentist will not needlessly run any risk of endangering the life of his patient, or bringing the gas into disrepute by attempting more than he can perform. Its reputation has most to fear from the incapable and unqualified who failing to manage it satisfactorily themselves, do not fail to speak of it deprecatingly ; from this cause more than any other, the public has become to regard the gas with an amount of fear and suspicion there is nothing in reality to warrant.

(To be Concluded.)

WHY DO FILLINGS FAIL? *

By Dr. H. H. HARRISON, WHEELING, W. VA.

It is said by some speakers and writers on dental subjects that it is not profitable to speak of our failures in society meetings, but rather to tell of our successes. It is certainly very much more pleasant to speak of successful operations than to rehearse our failures ; but when we all have failures is it profitable to speak of them, and inquire the cause, and seek more light the better to prepare us to overcome them in the future.

There are very many causes that may be considered sufficient to prevent fillings from arresting the progress of caries in the teeth. But before mentioning them in detail, let me say that we as dentists have fallen into the grievous error of thinking the principles involved in this operation are infallible, and have given out this impression to our patients until they consider a failure of a dentist to come up to their expectation in his operating, a sign of quackery, or at least a want of ability.

*Read before the Ohio Valley Dental Society, at Steutenville, Ohio, July, 1889.

We all realize that a perfect operation under favourable circumstances is as near permanent as any other principle will admit; but we know there is nothing permanent, and dental operations are no exception to the rule. Let us correct this error and stand on the same footing with other scientific and professional men. Let us not be humiliated and cast down when we have a failure, when, perhaps, forty-nine out of every fifty operations are successful.

The physician is called to a patient, with some disease, which he treats successfully, and the pathological condition disappears—the patient is well and he pays the bill—glad to do so. Within a brief period the patient has a second attack and the same physician is called at once. There is no lack of confidence no matter what the issue be. The cicatrix of the dentist remains a monument of his failure, but the physician's failure is generally buried beneath the clouds of the valley and soon passes out of mind; and no matter what mistakes he has made, law comes to his relief and his bill is among the first to be paid out of the estate. I only bring up these circumstances to show the injustice to dentists. I do not think physicians get any more honour or are better paid than they deserve, but I do think the conscientious, honourable and scientific dentist does not get what he deserves. Begging pardon for this digression, let us now enumerate some of the causes for our failure in arresting caries. I shall mention but four causes—

Defective nutrition.

Imperfect cleansing of the cavity of decay.

The use of improper material.

Defective manipulation of material.

Hence no doubt in my own mind that the first mentioned cause is the original first cause of caries, and that same condition still being present, the tooth may give way no matter how perfectly the operation of filling may be done. Hence this is a reason why fillings fail to save such teeth. The only way to overcome this obstacle is to prescribe a nourishment that will be more nutritious to the organ, and fill with a phosphate cement, giving your patient to understand the nature of the case. These are cases where good judgment and acute perception are required. It has been suggested that in such cases the patient be required to use phosphate of lime in solution (lime water) with the expectation that it will be appropriate to the building up of earthy qualities of the tooth.

This is a matter of dispute now among scientists, whether any mineral will be assimilated by the animal economy that has not first passed through the vegetable life, to unite in proper proportions with other elements. However this may be, it certainly is better practice to use the plan nature has laid out for the supply and nourishment of organized beings.

The second cause mentioned, imperfect cleansing of the cavity of decay, is one too frequently met with, and also one of the easiest to correct. It generally obtains with dentists that are tired—from their birth—or those that are unscrupulous and careless. This neglect is one that should never occur, and yet unfortunately is the cause for most of the failures.

The third cause mentioned very largely depends upon the judgment of the operator. We regard gold as being the best material to stop the progress of decay, and yet there are circumstances where other materials would be better than gold. Tin is better than gold in situations where the colour or lack of density is not objectionable. The cements are better than gold where the pulp is nearly exposed or in cases of excessive sensitiveness. Rubber is better for filling the root canals of teeth with dead pulps than any other material. Dr. Webb says any tooth that is worth filling is better filled with gold. In this I think he is in error as much as when he says, "No dentist can make as good a gold filling in any other way as with the electric engine plugger." No doubt the Doctor was honest, but he was an enthusiast in some things.

Amalgam, the much abused, has its place of usefulness, and when properly manipulated is a valuable material for filling teeth. Its being so readily prepared and inserted has caused a great deal of careless operating, and this has been its curse. Gold no more carefully used would not make so good a filling. The fact is that the operator should fully understand the characteristics of every material he handles as a therapeutic agent, and then his judgment would not wander when put to the test. But as I cannot give specific cases I will leave this part of the subject for others who follow.

The last division of my subject,—defective manipulation of material,—is one of the most potent causes for failure. Whatever material may be used, or whatever preparation of the many materials used, one feature of the operation must be the same. It must be thoroughly adapted to the prepared cavity. We will take one case for each kind of filling material. We will assume now that the rubber-dam is in place, the cavity

prepared and dry. We have made for a retainer, a point, slot, groove, undercut, or general form of cavity to hold the filling. We have selected a very small pointed plugger and soft sponge gold to commence the operation. We find the sponge gold or soft pellets go to the place designed by the use of this small pointed plugger with the force of a five ounce hand mallet, and is thereby thoroughly condensed before another piece is put on. Each successive piece is used in the same way until the cavity is nearly full, then with a medium sized foot instrument and No. 60 gold, with the same mallet, the filling may be completed in such a manner that it will be thoroughly adapted, as fully condensed and susceptible of a very fine finish and elaborate polish. A tin filling may be perfectly made after the cavity is made dry, by using No. 5 tin cut in strips and folded into small cylinders, and being placed in the cavity and pressed to place by a hand instrument. As each cylinder is placed in the cavity it must be placed on the opposite side of its fellow allowing the last piece to close the centre.

The rule given for mixing cements is to make the mass the consistency of thick cream. My experience teaches me that cements mixed about the consistency of soft putty are easier manipulated and more durable. The cavity should be kept dry, and filling too, for some time after insertion.

Amalgam should be mixed with the mercury and all the surplus removed, leaving only enough to prevent crumbling. Then into a dry cavity place a small piece, and with a bulb point instrument, force the filling all over the cavity pressing hard. Continue in same way until full, then take cotton and wipe off surplus mercury, and put in more filling, until when pressed, but little of the mercury comes to the surface. Finish with wet cotton. Indeed, the secret of success in filling is to practise thoroughness in every part of the operation, and this done will avoid all the failures than can be avoided.

DEODORISATION OF IODOFORM.—Heliotrope water is said to remove all odour of iodoform if used for washing the part at the use of that unsavoury medicament.

PRESIDENTIAL ADDRESS.*

By S. LEE RYMER, L.D.S. President of the British Dental Association.

IN entering upon the tenth year of the existence of the Association and glancing over its past history, the record, as it appears to me, is one of very remarkable success, success indeed far exceeding my most sanguine anticipations. I am not unacquainted with the fact that there are among our friends those who would have liked to witness something like a scene of transformation from a crude and chaotic condition to one of almost millennial splendour, accomplished with lightning rapidity ; but all experience teaches that in great undertakings such as ours, involving dealings with the position of to-day and for the time being, as also the charge of a mission to carefully scan the political horizon, and to regulate the educational requirements of the future, the work can only be carried on safely and wisely step by step, albeit in full confidence of success ; so that whatever obstacles have to be encountered (and such we may rest assured will prove neither few nor insignificant), a determined Executive, supported by a firm and united constituency, will be enabled to follow up the advantages already secured by an undaunted, progressive search.

Impatience, despondency, and want of faith are the three paralysing agencies in the growth of good works. Perish such influences so far as each one of us is concerned ! What we *aim* at is *perfection*, and very properly so, although, I suppose few, if any, of us are sanguine enough to hope to obtain to that exalted standard. At the same time, the higher we do aim the nearer are we likely to approach thereto. In another fifty years what changes will have taken place at the present rate of terrestrial advancement ! That future period will, no doubt, reveal something like a new world ; and those who are now assisting in the Brighton Conference are actually and practically engaged in at least partly moulding the events and conditions not only of the next half-century but even of time far in advance of its completion. Herein is considerable responsibility, as also ground for lofty effort, effort to be under-

* Delivered at the Annual General Meeting of the British Dental Association, held at Brighton, 1889.

taken in assurance of substantial result even if this result be not at once apparent in its entirety :—

“ We must believe; for still we hope
That in the world of larger scope
What here is faithfully begun
Will be completed, not undone.”

The history of the art and science of dental surgery, especially under modern aspects, has been so often and eloquently described on occasions like the present that it is altogether unnecessary for me to occupy your short and valuable time by reiteration. You know the loyal and persistent exertions of able men have thus far culminated in giving us such a fixed legal status that the national recognition of dental surgery, as a profession, is an accomplished fact. It is with the object of developing the power thus accorded that the British Dental Association exists. Its Memorandum and Articles of Association and bye-laws need only to be cursorily perused to prove that in this Association we possess an institution of varied efficiency thoroughly adapted to its purposes.

Firstly, of course, there is the main object, namely, that of carrying out the spirit and provisions of the Dentists' Act of 1878. Following in the wake (besides looking to the duty of caring for brethren in distress) are the several items coming under the very unfettered description of “ watching over and furthering the general interests of the profession.” The field of action is, in fact, almost without limit. Moreover, I think those who have watched the working of the machinery of action of the Association will agree with me that on the whole that machinery is well adapted to the end in view.

Now I will ask you, if you please, to consider well the force that can be brought to bear, as need arises, upon the Imperial Parliament by the British Dental Association, a body composed as it is of influential members, forming part of almost every electoral constituency in the Kingdom. I have no intention of dwelling upon the subject, but of this I am certain, that your reflections will shew you that here we possess an instrumentality of immense and vital importance. Then consider the effect, in the light of science, of the annual gatherings such as that of to-day and that of the benign social influences engendered on these great and exceptional occasions, besides valuable analogous results attained and yet attainable in the regular working of the several branch meetings.

If the Association had no other aims than those I have indicated it would be entitled to all our support. But consider besides the delicate department of operations included in our programme and known as "weeding out"—a necessary but unsavoury piece of business, which has been carried out conscientiously and with as much success as could have been expected under the limited powers of action hitherto available. It must be remembered that our profession has not yet emerged from a transition state, and that this particular work is therefore, of necessity, carried on slowly, and with liberal consideration. From the exigencies of certain localities, as well as of individuals certain practitioners of respectability have not always thought themselves able to keep strictly within the limits of professional dignity. In many such cases forbearance, coupled with friendly intercourse and advice, have resulted in such men abandoning all objectionable practice and becoming in every sense respectable members of society and welcome candidates for admission to the Association. Reclamation is a far more pleasant duty than prosecution.

Unfortunately the advertising quack, with his specious modes of victimising the public, is still in vigorous action. The Association has him in view not without the hope of giving him his quietus. But here the public themselves must be instructed to assist for the sake of their own protection. Argument with the natural quack is simply waste of time.

"Let Hercules himself do what he may;
The cat will mew, the dog will have his day."

I have alluded to these points as especially requiring consideration not only by members of the Association but by every dental practitioner who takes a real interest in his calling, because it will be seen that while many large questions are before us, such as those connected with education and examination, and the not improbable necessity in the near future of an application for enlarged authority under the Dentists' Act—a proceeding of supreme professional importance—it will be seen, I say, that through the influence and agency of the British Dental Association only can these questions be successfully grappled with and solved.

If this view of the situation be conceded, it becomes clear that the duty of good men and true is to rally round the Association. The greater the number of its members the greater its powers, is an observation which has often been

made before but which bears repetition. The roll already includes many hundreds of names and they are annually increasing in number, but having regard to the demands of a pregnant future there should no longer be hesitation on the part of those who have hitherto rested content with passive acquiescence in the aims and achievements of others doing the work, in themselves coming forward to lend a helping hand—in a word to become practical. Good wishes are all very well in their way, but without action they bear no fruit.

To all who care for their calling I should like to commend an extract from Dr. Johnson's essay entitled "The Fondness of every Man for his Profession," written in 1750 and published in *The Rambler*. The motto prefixed to the paper from Elphinston is, "Choose what you are ; no other state prefer." Johnson says :—"The passion for the honour of a profession, like that for the grandeur of our own country, is to be regulated, not extinguished. Every man from the highest to the lowest station ought to warm his heart and animate his endeavours with the hopes of being useful to the world by advancing the art which it is his lot to exercise, and for that end he must necessarily consider the whole extent of its application, and the whole weight of its importance. But let him not readily imagine that another is employed because, for want of fuller knowledge of his business, he is not able to comprehend its dignity. Every man ought to aim at eminence, not by pulling others down, but by raising himself, and enjoy the pleasure of his own superiority, whether imaginary or real, without interrupting others in the same felicity. The philosopher may very justly be delighted with the extent of his views and the artificer with the readiness of his hands. But let one remember that, without mechanical performances, refined speculation is an empty dream, and the other, that, without theoretical reasoning, dexterity is little more than a brute instinct."

To this enlightened description of what should be expected of men in regard to the improvement of their callings according to the talents of each individual engaged (published 140 years ago), let me add a few modern words bearing upon the subject of professional responsibility from the interesting presidential address of Dr. Lloyd at the annual meeting of the North Wales Branch of the British Medical Association, delivered last year. They are these :—"We are too lethargic in the matter of striving for and protecting our own

interests. Medical men would apparently by their actions make the outside world believe that they were too much engrossed in their daily work to undertake and organise for the protection of their rights and in the correction of manifest imperfections in the laws which affect them. There are hopeful indications that we are gradually acquiring the habit of bestirring ourselves in the cause of our rights and interests. Every member of the profession has a voice in the matters which affect his interests, if he will trouble himself to use it, and it is plainly our duty collectively to make our voices heard when the occasion arise which demand our serious attention."

The aim of all humanitarian effort is the promotion of happiness in the world—an object so noble in itself as to amply repay in its exercise whatever energy may be expended by these who take part therein. Towards the accomplishment of that end organisations both numerous and varied, religious, philanthropic, and scientific are in busy operation; each with subdivisions, we dentists being classed as belonging to the field of labour assigned to medical science. In this great field we find conscientious workers manfully doing battle with extant diseasesafflicting the human frame. Also straining every capacity to discover means of prevention so as to ward these off altogether. Thus, though the faculty have the applications of sanitation, together with the spread of knowledge among the people if the principles of rational living resulted in a marked decrease of average mortality even within the period of our own recollection.

There are not wanting scientists—amongst others, Dr. Richardson—who consider the present average duration of human life ought to go on increasing until the attainment of 100 years. It is undoubtedly true, whatever sceptics may say to the contrary, that quite a considerable number reach that age or an age closely approaching a century. Leaving alone cases of merely conjectured great ages, there are now living in this country some well-authenticated cases of centenarians. I myself not long ago saw an old lady of over 100, the inmate of a Union, with the faculties in good working order. From time to time we read about other such, although generally perhaps in the obituary chronicle. Within the last few weeks I have come across a few—one, the case of Mrs. Voss, who died on the 17th of last month at Shortlands, in Kent, aged 104 years. She had been the mother of ten children—her

hearing, sight, and memory unimpaired, and she was able to read and write without spectacles. Another the Sister Bonaventure, who died at Gaud some three weeks back. She was born at Menin, August 23rd, 1788, and had been a Sister of Charity for 78 years, so she would have attained the age of 101, had she lived until to-morrow.

Then there died on the 10th of April of the present year, that very remarkable and well-known man of science Monsieur Chevreul, aged 102. M. Chevreul retained his faculties and was a regular attendant at the Academie des Sciences and other learned Societies almost to the last. Recent cases might be multiplied. But I must content myself with mentioning two others as illustrating the fact that the centenary age is certainly reached. At Coosat, a village near Athlone, Margaret Mulschill, who is over a hundred years old, gave evidence on August 12th inst. (that is, Monday in last week) at a coroner's inquest relative to the death of Honora, her twin sister. The old ladies lived together, and on the previous Saturday, when Margaret went to market, she left Honora at home in good health. On returning she found her lying dead on the sofa. Death, natural and painless, had resulted from failure of the heart's action. John Walsh, an inmate of the North Dublin Workhouse, died only last week in his 108th year. He worked as a labouring man until ten years ago, when he fell in for £4,000. This he entrusted to a friend, who, becoming bankrupt, left poor Walsh to finish his days in the poor-house. In such records we possess a most encouraging incentive to perseverance in pressing on all means likely to swell the roll of the long-lived, and perhaps by and bye the statistician will really be able to mark down the average at 100 years.

In the meantime I should be content to see the applications of science so far successful as to place it at the average of the Israelites of old, as recorded by the Psalmist, three score years and ten. There is abundant evidence of the possibility and probability of that average being reached. When we hear of a well-known statesman of nearly eighty being knocked down the other day in Piccadilly by a cab, quickly recovering himself and overtaking the driver to take his number, it is only to be regarded as an instance, not at all infrequent, of vitality of those of 70 years and upwards. There are nearly 100 living people of hereditary title who have passed the octogenarian figures, and plenty are to be found in the various grades

of society, especially among the class known as "Annuitants."

I daresay Dr. Wheelhouse, in his able address of last week, before the British Medical Association at Leeds, had in view the idea of a largely augmented lease of life in the world when he referred to the yearly additions to the vast stores of medical knowledge and the mighty work being done in the diminution of pain and suffering—foreshadowing the time when by the spread of sanitary and other sciences the whole human race would be protected from the evil influence of the seeds of disease. At the same meeting, and pointing in the same direction, Dr. Brindley James advocated a measure worthy of all support, namely, the appointment of a Minister of Health.

In our speciality as dentists we possess potent elements applicable towards the march onwards. Health and life are dependent upon proper assimilation of food, which requires due mastication. Then we are interested in an especial manner in the question of the improvement through parent age, and rearing of the future physical status, which of course includes the teeth, and of all means to be employed in the process. A single point. In early life whole meal bread should enter largely into the diet table as containing so completely the requirements of perfect bone development. But it is now stated that its consumption is not an unmixed advantage, as the outer centicle of the wheat contained in the whole meal bread is of a very irritating nature, and that the phosphates so invaluable for building up the human frame and contained in the outer covering or the grain, cannot be properly separated and absorbed by the stomach. There is scope, then, for fuller inquiry as to the proper mode of preparing this food. It seems a small matter, but attention to trivials often leads to important results and the attainment of great ends.

Towards the earnest endeavours of the day to add to the public welfare, be it ours as a profession to contribute a large share. There is a cause to work for; there are means of action at our disposal. By encouraging the one and making good use of the other we may surely indulge the hope of leaving the world better than we found it. Thus will the lines of Edwin Arnold become applicable to each one of us :

"He dying leaveth as the sum of him
A life count closed, whose ills are dead,
Whose good works is quick and mighty, far and near,
So that fruits follow it."

British Journal of Dental Science.

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THE HYGIENE OF THE MOUTH.

It is remarkable that among even well-to-do people the necessity for keeping the buccal cavity and the teeth in a healthy condition, is hardly recognised and little cared for. Many times persons who are driven to consult their dentist on account of an aching tooth, are horrified when they are told their teeth "are in a dreadful state"—and resent it. They do not realize that of no portion of the human frame can it be said more truly than of the teeth that, "as you sow, so shall you reap." It is a hard matter to convince those in robust health that vitiated secretions or habits of neglect and carelessness entail the decay of their teeth, while the crippled state of the teeth in its turn leads to a general enfeeblement of health. It is, however, not of the many ailments affecting the body generally which ensue upon decayed and disabled teeth with which we propose to deal, but rather to point out that carious teeth are often the "weak spot" of the organism, and that by it infection from without is only too liable to occur. The rapid progress which microscopy and more especially bacteriology have made during the last few years has shown us that many diseases are communicated from one individual to another by means of extremely minute organisms, and further physiological chemistry has revealed to us that for such micro-organisms to exist, propagate and flourish, certain environments are requisite. We also have been taught to believe that micro-organisms give rise to certain changes in the fluids in which they exist, which changes are only too often highly

deleterious to the organism. Now the mouth and adjacent naso-pharynx have often been aptly compared to a cultivation chamber in which micro-organisms are placed in the most favourable position for development and multiplication, so that if our patients only knew it, they, by neglect of the ordinary laws of cleanliness, removal of particles of food, and the omission of washing out the mouth with an antiseptic wash, are preparing themselves for a mere breeding chamber for poisonous bacteria and micrococci. One often hears it said that "bad teeth run in families," and the belief, like all fatalistic, doctrines, undoubtedly does harm by rendering persons callous and so checking any inclination they might have possessed towards careful cleansing of the mouth. But the truth of the matter is not accurately expressed by this formula but rather by one which declares that an inherited bias towards early decay exists in families. In these families if more strenuous efforts are employed, and greater care taken in the daily ablutions of the mouth and teeth after every meal, the tendency to the early supervention of caries may and often is over-ridden and the teeth remain healthy for a long time. To dentists the facts detailed above are such home-truths that they imagine their patients are equally familiar with them, but they are not so, and it is unquestionably our duty to acquaint them with the deleterious consequences which inevitably follow habitual disregard of the hygiene of the oral cavity. Nor should our admonitions end here. In many cases of vitiated buccal secretions there is some depravity of health, and in a large number of instances reckless diet is the *fons et origo mali*. That questions of diet are outside the province of dentists may be urged, and not a few persons may be inclined to press the contention. For our own part, however, we believe that usually, dieting is a question of common-sense and that the dentist should be sufficiently well aware of the facts of digestion to be able to offer an intelligent set of rules to guide a dyspeptic into the best way of maintaining his stomach in a sufficiently healthy condition to ensure that the buccal secretions shall not become vitiated. The constant use

of tooth brush, tooth-pick, and floss silk, important as they are, is not by itself enough to ensure mouth cleanliness. The time of the tooth cleansing is at least as important, and the frequent employment both as wash and as gargle of antiseptic fluids are of the very first importance. Instructions with, regard to these points cannot be too minute or too detailed, if we desire to do the best for our patients. Life is made up of trifles, and the maintenance of a *mens sana in corpore sano* consists in a rigid observance of moderation, and the execution of a variety of details, none too minute, or too insignificant for the wise man to take heed of them or recognise importance. In the long run our patients will thank us for a few kindly words spoken and a few simple rules laid down for their guidance as to the efficient cleansing of the mouth.

A VICTIM OF COCAINE.—“Give me the sweet cocaine.” These were the last words of Dr. J. W. Underhill a minute before he died a few days ago. Miles Beatty, his faithful attendant, handed him the bottle. Trembling like an aspen leaf he convulsively grasped it, but could not get the bottle to his lips. His teeth were clenched together. He hung on to his attendant as he leaned back against several pillows. The attendant put the bottle to his lips. The dying man made a desperate struggle to force his tongue to the fascinating liquid, but the angel of death stood over his shoulder, and the teeth were as firmly glued together as the sutures of a skull and the mouth would not open. A second of exhaustion now came over the dying man, then a spasm, and, grasping his attendant by the neck, his heart stopped, his pulse ceased, he fell back limp and was dead. So, does the editor of the *American Journal of Dental Science* describe this terrible case. Like all habitual cocaine slaves, the doctor was subject to horrible delusions. He imagined that somebody, some enemy was continually pursuing him, trying to kidnap him. Delirium tremens patients frequently imagine they see horrible animals, gigantic monsters all mouth and no body, of all colours, and with numerous legs and claws, but the doctor

had none of these. His hallucination was always the same. Some enemy was after him. The death certificate will read "death from lockjaw," as that was the immediate cause of his death. A week ago, before his death while eating with a rusty silver-plated fork, he dropped it with sufficient force to penetrate the exterior portion of the left ankle. Only one prong penetrated the flesh. No blood came from the wound, which healed. Yet afterwards the limb became swollen, and symptoms of blood poisoning set in. A specialist in cocaine last year predicted that his death would be a sudden one, probably from pneumonia or pleurisy, or an accident, which a person with a less impaired constitution would resist and throw off. And so it was. The slight wound from the fork, which a man in perfect health would have paid no attention to, in the doctor's case, with his constitution sapped by the use of cocaine, proved fatal. The quantity of cocaine he could take in a day amounted to forty or fifty grains. He wanted it every half-hour or hour, then would sleep for half-an-hour or an hour. He generally took it in three or five grain doses. It produced a sort of stupor, and it was no uncommon thing for the children of the house to enter his room and find him in a doze, conscious yet stupefied. He told a curious tale about his becoming addicted to the habit. He was at one time a director of the Cincinnati Hospital, and about the time the anæsthetic quality of cocaine was discovered (in 1884) some leading physicians, he said, wished to try an experiment on him. He was hale and hearty, had no constitutional disease, no hereditary taint, and was possessed of great firmness of character and will power. He tried it, and found it to be an octopus out of whose grasp by no power of his own could he escape.

THE SHAH'S DENTIST.—One of the most honoured of the Shah's suite is, according to the *World*, the Imperial dentist; and Monsieur Hybennet has probably seen more of English high life than any person of his calling. In his second diary his Majesty frequently alludes to the Persian dentist-in-chief,

who is, I believe a Swede. One characteristic passage runs thus : “ Monsieur Cretien, also a dentist, who was known to me through having on my former voyage *amused himself* with my teeth, came some days ago, with Dr. Tholozan. Hybennet had filled a hollow tooth of my left upper jaw, but the filling had become loose, and Hybennet could not get it out ; but when Cretien had worked at it *for some days*, it finally came out. I was very glad, and am going to have the tooth filled anew.” This was in 1878, but Hybennet has still charge of the Imperial teeth.

THE PRESENT ASPECT OF THE IODOFORM QUESTION.—Investigation has proved that disease germs are aided in their septic work by certain chemical substances called ptomaines, which are formed in the tissues as a result of their action upon the tissues. Iodoform, while it does not destroy nor seriously hinder the germs, does destroy the ptomaines. Thus, we may suppose, the tissues, not being enfeebled by the action of the ptomaines, are enabled either to destroy the germs or to resist their malign assaults. In dressing wounds the surgeon must hereafter use two different sets of antiseptics. He must first seek, as far as possible, to exclude disease germs, or render them inactive, and for this purpose he must use germicides, such as corrosive sublimate. He must next endeavour, by applying agents like iodoform, to prevent the formation of poisonous chemical substances in the wound, or to decompose them and render them inactive if once they have been formed. These latter agents, if they, like iodoform, contain disease germs, must be disinfected before they are applied. Iodoform should be washed in corrosive sublimate solution.

THE CONSERVATIVE TREATMENT OF DENTAL PULPS.—Whilst some deny that the dental pulp serves any purpose in adult life, there are many facts which seem to support the contrary view. In a healthy person, if caries of a tooth takes place the formative activity of the pulp may be aroused and

dentine be deposited on the surface nearest the encroaching disease, and thus form a barrier, perhaps only temporary, but still a barrier to its further progress. After destruction of the pulp, certain pathological conditions—absorption and deposition of cementum—frequently occur in the root, and clinical observation shows that a tooth without pulp has, to use an old simile, one leg in the grave. How far a nerve that is exposed can be successfully treated in an interesting question. Depending as it does not only on the local condition but upon the general health, we find the most varied views expressed, one dental surgeon maintaining that he “caps” always, another that “capping” results sooner or later in trouble, and therefore destroys the pulp at once; but probably the best practice is to treat the individual case on its merits. Should a healthy nerve be wounded accidentally during excavation, most are agreed that if it be capped the tooth will be little the worse for the complication; and it is rather to exposure from caries that we refer. The operation of “capping” a nerve as commonly practised consists in first reducing all inflammation by the removal of irritating material from the carious cavity and repeated antiseptic dressings, and then covering the exposed surface with a mixture of carbolic acid or oil of cloves and oxide of zinc, and over this a small quantity of oxy-phosphate of zinc (white stopping), mixed very thin, is allowed to flow; when this has set, the carious cavity is filled. The number of substances used for the purpose of capping is large—collodion, egg-shell, sticking-plaster, cork, &c.,—the important points being that it shall be non-irritating, that there shall be no pressure on the pulp and no space between it and the cap. In an American contemporary, Dr. Parramore recommends, after three year’s experience in a large number of cases, sterilised sponge as a nerve-cap, and he opines that the sponge “becomes the seat of deposition of secondary dentine.” Whether this is so or not it is at present impossible to say, as of course in the successful cases no tooth post-mortem has been made; but at any rate it is worth a trial in the interests of conservative dentistry.

PROGRESS OF WOMEN IN DENTISTRY.—Dr. C. W. McNaughton, lady vice-president of the Michigan Dental Society, says ; “ Women in dentistry are yet as pioneers, only a few having entered the profession. The first woman to graduate was a German, who entered the Cincinnati College of Dentistry. She was followed by Henriette Hirschfeld of Berlin. The Empress Frederick has always encouraged women in trying to get out of the narrow limits in which they have been held. In 1869 Fraulein Hirschfeld upon her return to Germany, was so fortunate as to enjoy royal patronage, this at once bringing her into prominence. Since that time, several others from Germany and England have come to our country, and upon their graduations, have returned to practice in their native lands.

PLATINUM GROWING SCARCE.—In the course of an interesting editorial in the *International Dental Journal* the following occurs : The increased demand for platinum during the past few years has tended to raise the price very rapidly, and the last eighteen months has seen a rise of two dollars an ounce. It has doubled in value in the last decade, with the consumption increasing ; and, with no new fields being discovered, but one natural result can follow, and that is, a very marked increase in price in the near future. The increased demand is not so much due to its enormous consumption in the manufacture of teeth as to its adoption in the electric-lighting process,—every glass globe containing a coil of platinum wire. Platinum is the only metal thus far known that can be used in the manufacture of porcelain teeth ; the source of supply is confined almost entirely to the Ural Mountains in Russia ; some little has been discovered in South America, but none worth speaking of. Considerable money has been spent prospecting for mines wherever indication seemed to point to the discovery of the ore, but so far without any tangible results. In addition to the scarcity of the article the entire product of the world is in the hands of a powerful European syndicate, which manipulates the market

at will and control prices. The increase in the price of the metal can have only one result, and that is to raise the price of teeth or drive the manufacturer out of business. This specially relates to the so-called cheap teeth, which have during few years been so much improved, some grades having reached that state of perfection that the price can easily be advanced and yet compete with the higher-priced teeth; but other manufacturers will no doubt be forced to retire from business. Unless some means is found to substitute other metal or methods of manufacture, we very much fear that the dollar tooth will become a thing of the past.

SYPHILIS CONTRACTED THROUGH STRIKING THE KNUCKLES ON THE TEETH.—We recently drew attention to a serious outbreak of syphilis following an exhibition of Tattooing by a syphilitic. We now relate another interesting case. A laboring man came in August last, complaining of weakness, *malaise*, sweating on slight exertion, not feeling up to his work. Tongue slightly furred, temperature 100°, previous health good in every way. Nothing could be found to account for his state at first, but, his left hand was bandaged, and he admitted there was a sore on the knuckle, which had been under treatment for some time by a woman, but was very slow in healing. Uncovering the hand a perfectly circular sore was seen, the size of a threepenny piece, with clean-cut edges, bright red, without discharge, and surrounded by a purple area of very well-marked induration. It turned out that he had had a dispute with another man about three or four weeks before he came to me, and that this man, who was somewhat intoxicated, had angered my patient so much, that the latter struck him a blow in the face with his left hand, scratching his knuckle in doing so by contact with the other's teeth. There was no other probable source of infection that could be made out. He was ordered large doses of potassium iodide, and in a week or so there was marked improvement in all the symp-

toms. The surgeon of a distant mining settlement to which my patient's antagonist had since gone, was written to asking him to keep an eye upon the man, and report. After some weeks a reply came from him to the effect that the man whose mouth had been struck had turned up to consult him about well-marked secondary and tertiary symptoms of syphilis, contracted, as he admitted, two years before, and for which he had been under treatment.

DESTROYING NERVES.—The difficulty in preparing a nerve paste consists in the insolubility of the arsenic, or the preparation of an impalpable powder. Experiments which Dr. Bryan has made with an expert chemist have only resulted in our getting a fine powder by dusting it through a cloth, after long pulverizing in a mortar. With one part of this powder he rubs two parts of antipyrine and lanolin, to form a stiff paste. The lanolin, in a dry cavity, seems to penetrate the tissue, and to cause the antipyrine and arsenic to act, the first reducing actual inflammation of the part, and preventing further pain during the action of the arsenic.

A combination of—

Arsenic	-	-	-	one part,
Antipyrine	-	-	-	two parts,
Lanolin	-	-	-	two parts,

makes a painless devitalization possible.

ALUMINIUM SOLDER.—According to the *Scientific American* the following alloys may be used as solder for aluminium :

a.	Aluminium	8 parts ;	Zinc	92 parts.
b.		12		88
c.		15		85
d.		20		80

The aluminum is first melted ; the zinc added gradually. Finally some fat is added, and the whole is stirred with an

iron rod and poured into moulds. For flux use copaiba balsam, 3 parts ; Venice turpentine, 1 part, and a few drops of lemon juice. Dip the soldering-iron into the same flux.

AN EXPERIENCE OF COCAINE.—In the course of a discussion on the use of Cocaine, Mr. Mansell, of Birkenhead, said his experience had been totally different from that of the previous speakers. He used it rather extensively some twelve months ago. He had a number of very successful cases, but he had several unsuccessful ones, with rather alarming symptoms, which he attributed to the use of too large a quantity. He gave up its use for a time, but he was afterwards recommended to use a quarter of a grain, and in the next case that presented itself he tried it. He mixed a quarter of a grain in ten minims of water to operate on a man twenty-two or twenty-three years of age, in very good health and a strong-looking fellow. He got him in the chair and took up the solution of cocaine, and injected one-half, or probably four or five minims only. Almost immediately the most alarming symptoms ensued. The patient turned livid, the pupil dilated, and he struggled violently, and ultimately became unconscious. He remained in this state, greatly to their alarm, for five minutes or more. He then broke out into a profuse cold perspiration. They stripped him and used great friction, and then put him to bed, where, he was sorry to say, they had to keep him for about two days ; so that from that time he had discarded the use of cocaine altogether, and did not feel inclined to try it again. There was nothing in the man's condition to lead him to suppose that any difficulty would occur. He fully agreed that cocaine was a dangerous drug, and they had no line to go upon in its administration.

A DRY GAS BATTERY.—Mr. Mond and Dr. Carl Langer, have designed a battery to produce electricity direct from the

gases made in Mr. Mond's producers, and a new process for converting the carbonic oxide and carbo-hydrates contained in these gases into their equivalent of hydrogen by passing them together with steam over metallic nickel or cobalt at a moderate temperature, so as to make them suitable for use in the gas battery. This battery consists of diaphragms of gypsum inserted in a harrow-like frame impregnated with sulphuric acid, and covered on both sides with very thin perforated platinum leaf and a thin film of platinum black, which are connected to the poles of the battery by suitable conductors, composed of antimony and lead, and are exposed on one side to gases containing hydrogen, and on the other to atmospheric air. In this way an electric current is set up. The hydrogen is oxidised to water, and fully 50 per cent. of the energy it can yield is converted into electricity. This is an immense increase upon the best results obtained by steam engines and dynamos, which do not utilise more than 8 per cent. of the energy in the fuel employed. In shape the battery is oblong, the measurements being about 12 inches long, 8 inches broad, and 4 inches deep. Into this the diaphragms, which somewhat resemble a chessboard, are placed. In the course of the address, Dr. Langer put two cells in action, suspending a small electric lamp from the poles, and this glowed with astonishing brightness during the concluding part of the lecture. The quantity of platinum used is :—Perforated thin foil $2\frac{1}{2}$ grains, platinum black 7 grains, for each diaphragm.

LADY DENTISTS.—An exchange says : We heard once of a district nurse in a country parish who included tooth-extracting amongst her many duties, but we little thought dentists of the gentler sex would rise so high in the profession as is indicated by the standing of the young woman who has just been graduated from the Boston Dental College. According to the announcement of the dean, she stood No. 1 in a class of between thirty and forty, and in the race she has

run she was so far ahead of her classmates that she could hardly hear the tread of the fellow next behind her.

COCAINE IN TEETH-EXTRACTION.—In the St. Petersburg *Russkaia Meditzina*, No. 39, 1888, p. 623, Dr. I. S. Kolbaseno, of Kopal, writes that he resorted to Dr. G. Vian's method of local anæsthesia (*Therapeut. Monatschr.*, 1887, p. 502) in nine cases of teeth extraction, once in his own case. The method consists of injecting into the gum, on its buccal and lingual surfaces a solution of 4—5 of a grain of cocaine in ten drops of a 2 per cent. aqueous solution of carbolic acid. The following conclusions have been arrived at by the author:

1. In the presence of an inflammatory swelling of the gum, cocaine does not develop any pain-killing effects whatever, which may be explained by the well-known fact that infiltrated tissues lose their absorptive power more or less completely.
2. But when the gum is normal, *i. e.*, not inflamed, the injection is invariably followed in a few seconds by a local numbness, and in two or three seconds, never later than in four minutes by a complete anæsthesia. The extraction performed at this stage remains quite painless from the beginning to the end.
3. The injection, however, is constantly accompanied by a train of more or less pronounced general phenomena, such as giddiness, clouding of sight, acceleration of the pulse, and, later on, by a kind of drunkenness, with talkativeness, exhilaration, *etc.*, the symptoms being especially marked in anæmic and nervous persons. In the latter a genuine hysterical fit, with clouded consciousness, tears, *etc.*, may supervene.
4. Hence in those susceptible subjects a due caution is necessary.
5. The best means for preventing and weakening the general symptoms are these: (1) the injection should be preceded by the internal administration of a wine-glassful of rum or strong wine. (2) After the extraction the patient should be placed in a horizontal posture with his head hanging down. (3). Inhalation of two or three drops of amyl nitrite should be resorted to.

Abstracts of British & Foreign Journals.

THE DENTAL REVIEW.

SOFT RUBBER PALATES FOR CONGENITAL CLEFTS.

BY CALVIN S. CASE, D.D.S., M.D., Jackson, Mich.

OF the Kingsley's soft rubber palate he says its peculiar shape, lightness, flexibility, non-irritability, and the facility with which the muscles soon make use of it in closing the naso-pharyngeal opening, perfecting impaired tone and articulation, renders it fully capable of fulfilling the requirements of nearly, if not every case. It is not strange, he thinks, that so many are dissatisfied with soft rubber palates, because every attempt to produce them has been done with the view of making the veil of the palate full size from the beginning, and with no expectation or preparation for changing it afterward to meet requirements of newly developed functions in muscles, and changing shape of pharynx. This he holds can only be ascertained by time and an intelligent study of individual needs in order to give ultimately the proper shape, size and direction to the veil of the palate. In learning to talk, the effort to speak distinctly in order to be understood, will in the normal state result in the natural and complete development of all the muscles of speech. And though cleft palate children do not realize their condition, or that they are different from other people until later in life, still there is the same desire with laboured efforts, however futile, to speak distinctly. But in the latter instance, instead of the muscles being synchronously and normally developed, those which can be made to subserve the purpose of correcting the main defect, *i. e.*, the escape of sound into and through the nose, will be developed with unnatural functions and abnormal physical aspects, while others will continue in a rudimentary and useless condition. If this is allowed to continue far into adult life the capabilities of the muscles will have become so fixed by habit and development, as to be of little aid in working a movable artificial appliance. This has led many to the belief that the cooperating power of

muscles in all cleft palate cases could not be depended upon, and to strive in their practice to produce some immovable appliance which would in itself fill all the requirements. If, an instrument is inserted in youthhood or early adult life and one that is in perfect accord with the natural uses of the muscles, there will, he believes, be no ground for the above belief. When it is ascertained that the opening to the nares can be effectually closed by the palatal and pharyngeal muscles working in conjunction with the artificial palate these muscles will immediately commence developing new functions and changed physical aspects with this object in view—leaving the tongue and lips to acquire the methods of perfect articulation. Now allow if you please that the artificial palate or obturator is correct when it is first inserted—that is in shape, size and position, so as to be worn and borne, with the requisite degree of comfort—*it would soon be incomplete in many particulars*, and if as is too often the case, it can only be renewed by vulcanizing a new one in plaster, from a hard rubber pattern in the hands of the dentist, or from metal casts that were made with great difficulty and therefore changed—if at all—with great reluctance, or if it happens to be one of the palates made by Dr. Kingsley which he furnishes to those dentists who do not care to go to the trouble of making the models and palates for each case, subsequent vela would all be of about the same shape and size, and therefore incomplete as an adjunct in producing that perfect result that might otherwise be accomplished. Referring to vela where a soft rubber veil had been vulcanized to the posterior border of a hard rubber plate, and made to hang between and partly in front of the bifurcated velum-palati, and considers them ineffectual, and most of these had been worn in the mouth without change for years, probably on account of the difficulty of renewing them. In fact the majority of the patients were not aware that they would ever require to be renewed. In these cases where the palates had been worn longer than one year, that the soft rubber was so disintegrated by the fluids of the mouth, and the vela so changed in shape as to render them exceedingly unwholesome and useless, on this account alone. Whereas had they been right in other particulars and made so as to button on and off from the sustaining plate, and by some system that would admit of ordering a new palate from any part of the world, at little expense to the

patient and no particular trouble to the operator, the case would have been very different at the clinic of this Society. The writer insists upon the ease with which soft vela may be produced from the impression to the final vulcanizing of the palate, every moment in modelling compound, plaster, sand, metal, and rubber, can be produced with mechanical simplicity, and if desired, every piece can be duplicated with ease and dispatch, enabling the operator to rectify any error that may have been made in the first attempt ; and even after completion the possibility of readily changing the shape of the velum according to demands that are not at first recognized is a matter of no little importance. Further, the method which this system introduces of making the veil of the palate, at first thin and abridged so as to be more acceptable to the naturally sensitive mucous membrane, and afterward extending and thickening it, to meet the requirements of the case, by simply scraping away portions of the metal casts, is a desirable feature of the operation. Dr. Case's new flask, by which many difficulties are obviated, is made so as to use a minimum quantity of the metal—being now about the size and shape of a good sized goose egg. The inside surfaces are more perfectly polished and bevelled at a greater angle, greatly facilitating the removal of the models. And by an ingenious device the bolts are got rid of which were always difficult to manage, especially when it was necessary to close the flask containing sand impressions, previous to pouring the metal casts.

GOLD.

BY NEMO.

PURE gold, either beaten into very thin leaves or else in the form of extremely fine sponge are the best forms, because in these forms it can be used more nearly like a plastic substance. Gold cylinders are only foil rolled into cylindrical form and cut into various lengths. In practice it is found that under certain conditions gold that is not readily cohesive best answers the purpose, and usually the foil as it comes from the beater's hammer without being annealed will be found sufficiently non-cohesive. For other cases, especially in making contour fillings, it is desirable that the cohesive qual-

ity should be the most perfect possible. Any change we can make in it can only be a change of form, and to this we must resort after the foil is beaten, in order to develop the cohesive quality. To understand this it is well to trace the process of manufacture. The gold having been refined is melted and cast into an ingot. In this the crystallisation is perfect ; each crystal has its perfect form, and all the atoms occupy their normal relations to each other. The next process is rolling the ingot into thin ribbon. This compresses the gold, increases its density, and tends to convert the crystals into elongated and flattened layers. The ribbon is cut into squares and beaten into very thin leaves. This gives the gold a smooth, hard surface, and two of these surfaces can be made to cohere only with the greatest difficulty. If it is desired to make it absolutely non-cohesive under any degree of pressure from the condensing instruments, it can be done by depositing on the surface a film of foreign matter, or by the addition while the gold is melted of a very minute quantity of another metal. In neither of these cases will the filling be of pure gold, and if subjected to a red heat there will probably be a slight change of colour. The same change of colour may be looked for on the surface of fillings made with it. To develop to the utmost extent the cohesive quality, the first essential is that the gold should be absolutely pure ; next, that the hard, smooth surface should be changed to a softer and roughened one. Heat will produce this result. It renders the whole mass softer, and at the same time there seems to be a tendency to re-arrange itself in the crystalline form and in this way producing a roughened surface ; and when two such surfaces are brought into contact they interlock, and the points of union are so fine and close together that under very moderate pressure that two pieces become practically one. He thinks that the greatest degree of heat short of melting the gold, will be found the most effectual in annealing. In order to see the truth of this it is only necessary to consider how heat makes gold more cohesive. A piece of gold when heated occupies more space than it did before. This can only be by the separation of the atoms of which the mass is composed further from each other.

A QUARTER CENTURY OF OPERATIVE DENTISTRY.

BY DR. C. A. KITCHEN, Rockford, Ill.

THE exact date is uncertain when the first teeth were filled as a means of preventing further decay, nor is it known to whom the credit should be given for making the attempt. Records show that at a very early period devices were employed for filling vacancies occasioned by the loss of the natural teeth; that files were used to remove the rough edges and surfaces, and that cavities of decay were often filled with lead to prevent breaking the teeth in the attempt to remove them. The tenth of the celebrated Greek Laws of The Twelve Tables (relating to funeral ceremonies) has among others this direction: "Let no gold be used, but if any one has had his teeth fastened with gold let it be lawful to bury or burn that gold with the body." In 1776 there was not a dentist in America. A few years later, several had commenced practice. Among them were men of inventive genius who laid the foundation principles of modern dentistry. Dr. Eleazer Parinly said that the first gold filling he ever saw was in the year 1815. The use of gold as a material for filling teeth marked an epoch in the history of dentistry. Although the methods first used in its preparation entailed much labour and patience (as it was the custom to make the foil from gold coin, the operator rolling out and beating the gold coin in foil as required), yet its many valuable properties were soon known, and those who were expert enough to properly prepare and use it were enthusiastic in its favour. Our dental ancestors were soon called upon to battle against the encroachments of quacks. About the year 1833 two Frenchmen (Crawcour by name) introduced with a "great flourish of trumpets," what they called "Silver paste," but which proved to be a worthless quality of amalgam. They succeeded by much advertising in attracting attention to their new material, and, although not themselves dentists, they were able to draw many patients away. The Amalgam war raged fiercely, and resulted in a drawn battle. The Crawcours were driven out of the country, but many others had adopted the habit of using the vile material they had introduced. The first dental college, the first American dental journal and the

first dental societies were instituted about the year 1840. The pioneer movers in these worthy enterprises, Drs. Harries, Hayden, the two Parmleys and others. In the year 1844 the Mississippi Valley Dental Association was formed. The American Dental Association elected its first officers in 1860. Wm. H. Atkinson was the first president. At the convention meeting in 1865 at Chicago many for the first time saw rubber dam and heard for the first time about the mallet for condensing gold. With the exception of a very few who used crystal or sponge gold all were using soft gold foil for filling teeth. None present realised that these new aids were to revolutionize the methods then in vogue. The valuable properties of cohesive gold were demonstrated on that occasion by Dr. Atkinson, who produced a piece of solid gold which had been made from soft foil welded at a low temperature, thus confirming what he had previously advocated,—that gold might be welded at a low temperature in the act of filling. The use of cohesive gold soon became general. At this period there were no dental colleges in the west except the Ohio, at Cincinnati. There were two western State societies—the Iowa and the Indiana ; while St. Louis and Chicago had the only city associations. The few dental colleges in the eastern cities received but little support or encouragement, and their stockholders probably received no dividends. Students or more properly, apprentices, were initiated into the mysteries of the art upon the payment of a good round fee, and after serving from three to twelve months, the actual practical knowledge they acquired amounted in most cases to little value. There were but few dentists throughout the country, who were competent to perform creditable operations, much less to show or teach others. The methods then often employed to secure patronage are spoken of. The large, showy sign, newspaper advertisements calling attention to handsomely furnished dental parlours, or to wonderful operations performed in *jewellery* filling, etc., which are now the exception—the dentist who makes use of them lying under strong suspicion. The presumption which first suggested these unprofessional methods, together with the ignorance which made them tolerated and remunerative, have passed or are passing away. Many who attended their first dental society clinic saw, for the first time reasonable, dispassionate discussion. Twenty-five years ago the comparatively few who were really expert operators were

well-known. Manipulative ability to insert good fillings is not the only accomplishment of the dentist. He has acquired a better knowledge of diseases of the mouth and teeth, and a better acquaintance with the medicines suitable for their treatment. The writer deprecates the too extensive use of crowns and bridge-work, and insists upon the primary importance of successful filling. Some, he says, find many occasions for re-planting and transplanting teeth, yet the majority are not hopeful of good results in these directions. The development and growth of dentistry as a scientific calling has not in the past depended so much upon experiments, nor on the innumerable inventions and appliances furnished for our convenience, but progress has been made because of the ever increasing anxiety of the members of the profession to obtain valuable information and make it of practical use in the daily routine of practice. Some to whom were denied the opportunities now afforded of attending meetings have reason to be grateful to the men who have stood by these various enterprises. Every dental society, college, and journal, owes its success to the devotion of men whose personal services were indispensable, and whose names deserve to be written upon the pages of dental history of the future.

DENTAL COSMOS.

CAMPHO-PHENIQUE.

BY J. FOSTER FLAGG, D.D.S.

CAMPHO-PHENIQUE is a germicide and antiseptic, non-irritant, local anæsthetic non-poisonous, being insoluble in water or glycerine, and does not discolour while it is applicable in sensitive dentine, and escape in most if not all inflammatory states. Where cotton is introduced as a wedge, and especially where marked sensitivity of dentine exists in connection with such cavities between teeth, both the discomfort attending separating and the pain attendant upon subsequent preparation of cavities are largely, and frequently completely, abrogated by its use. In cases of pulp-irritation, even of severe grade, its application, upon cotton, will almost invariably demonstrate its high rank as a "pain-obtundent." In devitalization of

pulps its use as the menstruum for the arsenic and acetate of morphia in our "devitalizing paste" seems to have already given evidence of its value as a local anesthetic in that connection. As a disinfectant of tissue surrounding pulp-cavities and canals which have contained putrescent pulps it has made an excellent record, and has proved itself, to be one of the very best applications for the purpose. As a medicament, or ingredient of medicaments, for canal-dressings, either temporary or *permanent* upon cotton, its combined characteristics of *antiseptis* and *insolubility* must command favourable recognition. As an antiphlogistic in the earlier stages of sthenic pericementitis, applied upon the gum with small pads of muslin and renewed with *only desirable infrequency*, it has oftentimes been able to produce the attempted resolution; and in cases where this was found impossible, to largely mitigate the suffering attending the induction of suppuration. As an antipyogenic, used by injection into fistulæ, either in full strength or diluted by fluid or viscid cosmoline or lanolin, it has produced eminently satisfactory results in some markedly discouraging cases. Campho-phenique is also of use for wounds (cut or contused), burns, sprains, intolerable itchings, etc.

ABSTRACT OF A DISCUSSION

on Dr. Ingersoll's paper on "The Relations of the Dental Pulp to the other Dental Tissues."

Dr. BOGUE had never before heard the view expressed that the dental pulp was an independent thing from the fibrillæ occupying the dentinal canals. Alluding to the destruction of the pulp by arsenic, or any other corrosive agent, and its removal, Dr. Ingersoll calls attention to the large number—250,000 dentinal fibres, that still remain in the dentine. If that is a true view, it is an important point to have elucidated what treatment to apply to antisepticise completely those fibrils. Another question—the advantages that are obtained in our use of obtundents; Dr. Ingersoll states the greatest sensibility of the nerves does not lie in their peripheral extremities. In the text-books it has been stated that the nerve-fibres have not yet been seen to pass through the dentine. We know the office of the dental pulp; of the presence of this net-work

of nerves underneath the enamel ; of the commencement of the dentinal fibrillæ, and their passing from the pulp outward into the dentine, but we do not see them pass all the way. Dr. Ingersoll had not yet told of the gradual retraction of this pulp, or dental nerve, to a point where it is no longer serviceable in the economy. The speaker asks at what age the office of the dental pulp ceases. The exposure of a pulp in a person of twenty years would seem to be a very different thing from the exposure of the same pulp in a person of fifty years. Dr. Ingersoll in reply, said : There is such a great difference in the period of full development in different individuals that there can be no line drawn or time stated. There is, he thinks, a period when the teeth are complete, and then the formative organ becomes dormant, although not dead, not lifeless. He thinks that at ten years after complete emergence, where there is good development of the structure, a tooth may be considered as complete. Dr. Perry had often questioned, in observing these cases, whether the death of the pulp would not have some effect in checking the condition that we call the senile condition, which according to Dr. Heitzmann, is a return to the embryonal condition. Assuming that a tooth had reached its maximum of density at say forty or forty-five years of age, and the pulp being destroyed, the question is whether that tooth might not be, after all, even more lasting than it would have been if the pulp had remained alive. If the pulp were destroyed in early life, the tooth surely would not last as well. The whole question of pulp-destruction is one that hinges upon the age at the time. In young persons he would try to keep the pulps alive : in adults or middle-aged persons he would be more indifferent. We do not do our full duty, he thinks, in the care of teeth which we devitalize if we simply remove the so-called pulp and fill the canal. There is a large proportion of organic matter in the tubuli, and if we have no means of getting it out we yet have means of mummifying and rendering it harmless. After thoroughly drying the tissue, we should use such antiseptics as will have this effect before the root is filled. Dr. Carl Heitzmann said : the term "dental nerve" could not replace that of "pulp." There are nerves in the pulp in great quantity, unquestionably, but there are a great many other things besides. There are myxomatous connective tissue and blood-vessels ; so it would not be proper to call the pulp a nerve. The microscope has shown that nerves exist in the pulp, but they

are by no means alone there. That the fibrillæ, are offshoots of the pulp; and as the pulp is a nerve, therefore the dentinal fibrillæ must be nerves too, was expressed by the elder Tomes many years ago. Dr. Bogue has remarked, nobody has yet traced the connection of the dentinal fibrillæ with the nerves of the pulp. We all admit that there are nerves in the pulp, but that the dentinal fibrillæ are nerves we are not yet warranted in believing. Is it not enough to say that there is living matter in the pulp, which in one instance forms connective tissue and in another instance nerve-tissue? These forms of tissue differ only morphologically. The organic basis of the dentine is a gluey substance, whereas the real living part is a soft, jelly-like matter. If the pulp is extracted or destroyed, to be sure, the living part is destroyed and the tooth deprived of its vitality. Unquestionably the organic matter may remain unchanged in its form, as we see in the teeth of antediluvian animals that have been buried in the ice for many centuries. The form is preserved, but not the life. The dentine in dead teeth is different from that in living ones. We know that in all cases when a foreign body is introduced, such as every filling-material is, a new mass of secondary dentine will be formed in the living human teeth. We know that if a gun-ball penetrates an elephant's tusk in life, there is set up around that ball a severe reaction, leading to the production of osteo-dentine. If we destroy the pulp, unquestionably we destroy the vitality of the dentine to such an extent that reaction will not take place. We are aware of the fact that a certain amount of life is imparted to the tooth after the destruction of the pulp, through the pericementum or the periodontal membrane, and we are prepared to understand that there is a gradual diminishing of life from the periphery toward the centre. There is no abrupt line between the absolutely dead and the absolutely living parts, but a gradual fading from the one to the other. Whether that is uniform in all teeth after the destruction of the pulp is a mooted question which no microscopist can solve. A certain amount of life may remain in a tooth after the pulp is killed; but to say that the destruction of the pulp is therefore of little importance is a bold assertion. He thinks from the experience gained by the use of the microscope that to destroy pulps in the teeth of young persons before twenty to thirty years is malpraxis. In persons of forty or more years of age it is an entirely different operation, and probably doe_s

not amount to much ; still the pulp should always be saved when possible. Why ? an important duty of the pulp, even in advanced age, is the formation of secondary dentine. When the teeth are ground off by mastication or other causes, the pulp will produce secondary dentine for their protection ; a certain amount of its tissue is transformed into secondary dentine, which gives ample protection, not only against pain, but infection as well. This office alone would be worth the saving of all pulps that can be saved. Nevertheless, every practitioner knows that a tooth may remain serviceable for years, or forever, after the destruction of the pulp. Dr. Sudduth :—It is a mooted question as to whether nerve-tissue is found in the dentinal tubuli or not. But it is not necessary that nerve-tissue should be there in order that sensation may be transmitted. Take an amoeba, in which one has determined the presence of nerve-fibres, and a touch at one portion will cause the mass to draw away. The natural tendency of protoplasm is to conduct sensation. The pulp has no characteristics at all in common with ganglionic structures. It has nerve-fibres, and we have traced those nerve-fibres to almost as fine terminations as the nerve-fibres in any other portion of the body, but our finest technique has never enabled us to see them pass beyond the odontoblastic layer. In reply to the contention that fibres may be so fine that we cannot trace them under the microscope ; it is possible, but we have in connection with the microscope aids that go beyond our ordinary ocular powers of interpretation. The fibre, if present, would give some reaction to staining agents, and by that means we can trace it until it becomes very minute indeed, if it is continuous. As regards the value of the pulp in dentistry, his experience would not lead him to place the same value upon the dental pulp as Dr. Heitzmann. After a tooth has reached its normal development, then except it be for producing secondary dentine, the pulp is no longer of any material value. When a pulp-canal is opened, a gate way to infection and subsequent pericementitis is opened ; but except that one thing, and the danger of subsequent infection, which is very much lessened if not entirely nil by our present knowledge of antiseptic treatment, the pulp is of little or no benefit. When a tooth is fully formed, the value of the pulp to the tooth is greatly lessened if not entirely destroyed. There was another point, in regard to the reaction which Dr. Ingersoll mentions as

coming from the inflammatory process,—pericementitis. Dr. Sudduth does not think there is any reactive force, to amount to anything, to be even visible as a pathological condition, that we can demonstrate outside of the pulp-canal. Irritation conveyed to the fibrils of the odontoblasts at their periphery is carried to the pulp-tissue itself. The natural function and office of the odontoblastic layer is to form dentine, and as a result of irritation secondary dentine is formed. Dr. Atkinson insisted upon the importance of securing a sterilized condition of the dentinal fibrils, occupying the dentinal tubules. He affirms he has seen cases where chloride of zinc was used which converted the pulp-substance into hyperoxidized hydrate of carbon in one case; and in another into hydrozincate of albumin,—indestructible substances, and next to living pulp in preservative quality.

DOMINION DENTAL JOURNAL.

SENSITIVE DENTINE.

BY J. B. WILLMOTT, L.D.S., D.D.S., M.D.S.

ACCORDING to Dr. Clark, experiment has demonstrated that protoplasmic cells are sensitive, and manifest their sensibility in response to contact with stimulants both chemical and mechanical. The tubules of the dentine are occupied by projections from the protoplasmic odontoblasts. The central end of the elongated odontoblast is in close association with the fine nerve filaments in the periphery of the pulp. A fair assumption from these facts seems to be, that the sense of injury experienced by the free extremity of the odontoblast is communicated to the nerve filaments, with which its central extremity is associated, and by these transmitted to the brain. Whatever may be the precise *modus operandi* by which it is affected, it would seem perfectly clear from the anatomical structure of dentine, that sensation is conveyed through, or by, the contents of the tubules, and that sensation in dentine is confined to these contents. Though all dentine is more or less sensitive, there is a vast difference in the normal sensibility of the teeth in different individuals. This variation is dependent on age, temperament, sex, quality of tooth tissue, and other causes, and is so great that what would be hyperææs-

thesia in one patient would not reach the standard of normal sensibility in another. The writer's view is that hypersensitive dentine as a pathological condition is analagous to the familiar condition known as "teeth on edge," and is produced by the same general cause, the irritation of an acid. In a severe case of "teeth on edge," from eating sour fruit, the irritating acid is concentrated and abundant. It passes through the pores of the enamel, which is itself devoid of sensation, and acting on the peripheral extremities of the fibrillæ, causes such irritability in this tissue, that the slightest impact on the external surface of the tooth, or any material elevation or depression of temperature, causes extreme discomfort. In the hyperæsthesia ordinarily observed in dental practice, in association with caries, the irritating acid is dilute and not in large quantity, so that the effect is produced slowly and requires for its manifestation greater variations of temperature, the contact of such irritating agents as sugar or salt or some injury to the locally affected, as the cut of an excavator. If we diagnose this as a pathological condition, the indications will be to gently remove as much of the debris as may be done without severe pain, neutralize a free acid with a drop of liquor ammonia and fill temporarily with zinc phosphate, thus shutting out the irritant and permitting the exalted sensibility to subside. If the sensitiveness, extreme though it be, is the normal condition of the tooth, temporary filling for a month, or for a year, could not be expected to afford any relief. The fact that the average dentist is able to discriminate with a good degree of certainty between the normal, the pathological does not bring him much comfort. What he wants is some easily available treatment that shall promptly control either or both. There are two principal methods by which this may be accomplished; by evaporation, and by the use of agents which have a marked affinity for water. To succeed by either method it is essential to protect the cavity from moisture, not only when the dehydration is being accomplished, but until the excavation is completed. With the advent of moisture we soon have a return of sensation and that exalted by the irritation of the previous dehydration. If we propose to dehydrate by evaporation, a good plan will be to protect the cavity, thoroughly absorb the free moisture, remove the loose debris, then saturate the cavity with absolute alcohol, and, in a minute or two, absorb it and apply a jet of

warm water by one of the appliances for that purpose. In this way the water is evaporated and the fibrillæ retracted to a greater depth than by using the warm air alone. Of the available agents having a strong affinity for water, zinc chloride has long been used as an obtunder, the effect being generally ascribed to its escharotic property. The fact that the sensation returns after a brief period would seem to contradict this theory. It is more probable that its virtue is largely due to its activity as a dehydrator. The best results will be obtained by protecting and thoroughly drying the cavity, removing the loose debris, then introducing zinc chloride in crystals, forcing them against the wall of the cavity. When the pain has subsided, absorb the now fluid zinc chloride and carefully exclude moisture until the cavity is prepared. Whatever agent is used the same general procedure is indicated. A preparation consisting of equal parts by weight of absolute alcohol, anhydrous glycerine and tannic acid has been used with good success, though it is doubtful if the astringent adds anything to its virtue, that depending on its dehydrating property. What is known as Herbst's obtunder, whether so designed or not, is evidently a combination of a dehydrator, sulphuric acid, with an anæsthetic, cocaine, with a view, doubtless, to lessening the pain of the application. As its efficiency would seem to depend on the presence of an amount of free sulphur acid, danger to the integrity of the tooth tissue might reasonably be apprehended. What is known as Robinson's remedy—carbolate of potassium—when properly prepared is a really efficient agent. Rub together equal parts of carbolic acid in crystals and potassium hydrate. This, however, results in a powdery mass very inconvenient for use. The addition of about fifteen minims of anhydrous glycerine to each dram, makes a friable solid mass which can be readily applied to the cavity. That which is sold in liquor form, however valuable in the treatment of pyorrhœa alveolaris, is not the best form for use as an obtunder of sensitive dentine. In the use of this agent the same precautions are necessary in the exclusion of moisture as have already been referred to in the use of zinc chloride. In comparison with zinc chloride the pain of application is less severe and not so long continued. He suggests placing a drop of a strong solution zinc chloride in a considerable portion of white of egg. In the course of a few hours the coagulated mass will have extended to the

diameter of probably an inch. A fragment of carbolate of potassium of similar size will, under similar circumstances, have converted a considerable portion of the albumen into a firm transparent jelly, possibly due to the abstraction of its water. There are a number of other agents, such as dry chloride of lime, potassium carbonate, etc., which have an affinity for water, and might doubtless be used with some success. Arsenic acid, for obtunding purposes, has been proved to be so dangerous to the vitality of the dental pulps, that it has ceased to be used for this purpose, and need not be here discussed. To sum up—the points I have endeavoured to make are: 1st. Excessively sensitive dentine may be either a normal or a pathological condition. 2nd. As a pathological condition it is due to acid irritation. This irritation may be local and confined to the walls of the carious cavity, or it may be systemic and affect teeth otherwise healthy. 4th. This pathological condition from systemic causes may be effectually treated by antacids, and when from local causes by the neutralizing of the debris in the cavity and temporary exclusion of the irritating agent. 5th. That exalted sensibility of dentine, whether normal or pathological, may be successfully combated by intelligent dehydration. 6th. The treatment to be effectual must include the entire exclusion of moisture until the cavity is prepared. 7th. That the dehydrators with which I am familiar may be placed in the order of their utility as follows, viz.: (a) Absolute alcohol and warm air combined. (b) Robinson's remedy. (c) Zinc chloride in crystals. (d) Alcohol, glycerine and tannin.

SULPHUR FUMIGATION.—Fumigation by the burning of sulphur is the most common method employed by boards of health in the disinfection of apartments in which contagious disease has existed, and the clothing worn by the patients during their illness. In an address delivered by the distinguished chemist, Dr. E. R. Squibb, before the King's County Medical Association, he calls attention to the fact that there must always be an abundance of watery vapour in the room to be disinfected; otherwise the sulphurous acid gas generated by the burning of the sulphur is not an efficient disinfectant. The same is true of chlorine when used for disinfecting purposes.

Dental News.

THE INTERNATIONAL DENTAL CONGRESS.

ARRANGEMENTS for the coming International Dental Congress are being rapidly perfected, through the joint labours of the "Committee of Organization," which was appointed on the 4th of December, 1888, by the Minister of Commerce, who is the Governor-General of the Universal Exposition, under the auspices of which the Congress will be held.

The Committee have just issued a circular addressed to the President of all properly organized Dental Societies, the world over, of which we print portions, as follows :

The object contemplated by the Odontological Society of Paris, in the organization of the International Dental Congress is to make known the progress of Odontological Science, contributing to its further development by the discussion of various questions pertaining to dental art.

Dental societies are cordially urged to further the objects of the Congress by sending delegates in person, or papers to be read before the Congress.

Names of delegates should be sent in as soon as possible, also the name of a Corresponding Secretary for the local society, to M. M. F. P. Pourchet, 24 Rue de la Chaussée d'Antin, Paris, France, to whom all communications relative to the Congress should be addressed.

The Congress opens on Sunday, September 1, 1889, and lasts one week.

The opening and closing sessions will be held at the Exposition, at the Trocadero.

Scientific sessions will be held at the rooms of the two Odontological Societies, 57 Rue Rochechouart, and 3 Rue de l'Abbaye.

Clinics at the operating rooms of the Dental School of France and the Dental School of Paris.

The Congress will be divided into four sections :

- 1st. Anatomy and Physiology : Normal and Pathological.
- 2d. Operative Dentistry : Special Therapeutics and Materia Medica.
- 3d. Prosthetic and Orthopedic Dentistry.
- 4th. Dental Education and Instruction.

The subject to be discussed will be classified as :

1st. Those chosen by the Committee of Organization.

2d. Voluntary.

They will comprise first essay in French, English, German, Italian, or Spanish ; all conclusions being announced in *French*.

3d. The discussion.

4th. Practical demonstrations—operations in operative or prosthetic dentistry, and the exhibition of new instruments and appliances.

Those requiring space for illustrations, apparatus or other accessories, should signify this as early as possible.

Essays will be limited to fifteen minutes, which at the pleasure of the president may be extended to twenty. Any further extension of time is subject to the vote of those present.

3d. The choice of material for the construction of artificial dentures.

4th. Restoration of the face and of the maxillaries.

SECTION IV.—*Dental Education, Instruction and Hygiene.*

1st. Education in the art of dentistry : methods ; length of courses.

2d. Dental and oral hygiene during the periods of dentition.

Everything is being done to make the meeting profitable to all, and the number of visiting dentists will doubtless be very large.

Dr. Cunningham, of King's Parade, Cambridge, is the English Secretary.

THE BRITISH DENTAL ASSOCIATION.

THIS Association, which is formed on the same lines as the British Medical Association, commenced its Tenth Annual Meeting Aug. 22nd. in the Pavilion at Brighton.

Mr. Daniel Corbett, of Dublin, who occupied the presidential chair last year, being unable to visit Brighton, the chair was occupied by Mr. J. Smith Turner.

Mr. F. Canton the Treasurer made a good report as to finances, declaring a satisfactory balance at the bankers.

Mr. Morton Smale in reading the report of the Executive for the past year, said : The prosecution of offenders against the Dentists Act as hitherto conducted, although eminently successful from a legal point of view, has not produced that impression on the public generally which is so very desirable, but it is hoped in the immediate future by concerted action to not only punish offenders but also to impress the public and enlighten them how to distinguish between the regular practitioner, and the quack or charlatan. Three prosecutions have been successfully carried out during the past year. It is hoped during the coming year to deal with those quacks who, unable to call themselves dentists or dental surgeons, evade the Act by styling their premises Dental Institutes, Dentoriums, &c., &c. He said that the numbers were 763, against 710 last year, showing a net gain of 53. That the Association had lost by death two ; one of these, Mr. Spence Bate, F.R.S., had a reputation as a scientist that extended far beyond the confines of the Dental profession.

The following gentlemen were elected Vice-presidents of the Association :—Sir John Tomes, F.R.S., F.R.C.S., L.D.S., Sir Edwin Saunders, F.R.C.S., John Smith, Esq. (Edinburgh), F.R.S.E., M.D., F.R.C.S., LL.D., L.D.S.

It was decided to hold the next Annual Meeting at Exeter, Mr. Brown-Mason of that city being chosen President-elect.

Mr. S. Lee Rymer, J.P., the president for the year, then delivered his inaugural address, (see page 749) in which, after welcoming the Association to Brighton, and thanking the members for the honour of his election, he proceeded to review hopefully the probabilities of prolonging the average of human life to seventy years, the aids of science, including dentistry, being employed towards this end.

The remainder of the day was occupied by the reading and discussing several important papers on Anæsthetics, their nature and action and methods of administration.

The meeting continued for three days.

To remove chloro-percha from instruments, dip them in hot water, wiping hard with cloth.

FACULTY OF PHYSICIANS & SURGEONS
GLASGOW.

The following name should have been included in the July pass-list, as having been admitted a Licentiate in Dental Surgery :—Thomas Charles Culledger, Stroud.

APPOINTMENT.

Mr. Edgar A. H. Field, L.D.S., Eng., has been appointed House Surgeon to the National Dental Hospital.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

ANÆSTHETICS AT THE BRITISH DENTAL
ASSOCIATION.

To the Editor of the British Journal of Dental Science.

SIR,—Had I been able to join in the debate upon this subject, I should have drawn the attention of the Meeting to the following facts, viz.:

1. The excellence of the attendance; the number of Medical men present, and the marked enthusiasm with which the papers were received by this mixed audience.

2. The high-class character of the papers submitted to the meeting.

From these facts, may, I think, be deduced the opinion, that the subject of Anæsthetics is one which is attracting more and more attention, not only among Dentists in particular, but also among Medical men in general; and further, that the subject is one which is distinctly progressive, and is well worthy of accurate and scientific study.

Granting the truth and justice of these deductions, I do not see how we can avoid coming to the conclusion that the subject is worthy of a more prominent position in the curriculum than is at present assigned to it.

It is true that Clinical teaching of the art is carried out with marked ability and success at the Dental Schools, but I am unorthodox enough to hold that Clinical teaching alone is not in itself sufficient, but may, on the contrary, encourage superficial knowledge and tricky "rule of thumb" procedure, and that this is especially the case when attendance upon such Clinical work is purely optional on the part of the student.

As a step in the right direction I would suggest, that the subject of Anæsthetics should be definitely included in the Dental Curriculum, and that lectures, or a short course of lectures, be delivered systematically each year at the various schools.

I am, &c.,

J. FREDK. W. SILK,

Anæsthetist to Guy's Hospital (Dental School), &c., &c.

ANSWERS TO CORRESPONDENTS.

A REGISTERED DENTIST *sine* diploma cannot elaim any title from any college or university. To obtain any title he must either take a diploma here or graduate abroad at Harvard or Michigan.

To Correspondents.

1. Communications intended for insertion in the ensuing number must be forwarded to the Editor, at the Offices 289 & 291, Regent Street, London, W., by the 8th and 23rd of the month, and must be duly authenticated by the name and address of the writer.
2. We cannot undertake to return communications unless the necessary postage stamps are forwarded.
3. It is earnestly requested of our correspondents that their communications be written on one side of the sheet only; and we also beg to call particular attention to the importance of a carefully-penned signature and address.
4. All communications relative to subscriptions and advertisements are to be addressed to the Publishers, Messrs. J. P. Segg & Co., 289 & 291, Regent Street, London, W.
5. The Journal will be supplied direct from the office on PREPAYMENT of subscriptions as under:

Twelve Months (post free) - - - 14s. od.

Post-office Orders to be made payable at the Langham Place Hotel Office, to G. E. Skliros, 289 & 291 Regent Street, W. A single number sent on receipt of seven (penny) stamps.

British Journal of Dental Science.

No. 520. LONDON, SEPT. 16th, 1889. Vol. XXXII.

NOTES ON NITROUS OXIDE.

By J. OTTLEY ATKINSON, L.D.S., Eng.

(*Concluded from page 754.*)

It is the opinion of more than one eminent writer that not more than two, or three teeth at the most, can be extracted during the anæsthesia produced by one administration of gas ; this does not coincide with the conclusions arrived at by others. No two cases presenting precisely the same features, the number will vary with each ; and no rash promises ought to be made to either patients or their friends. But at the same time, assuming the cases to be of the ordinary type, an expert extractor will frequently succeed in clearing either an upper or lower jaw at one administration. One Specialist in the city of Philadelphia accomplishes this almost daily. The writer has frequently seen this done, and in one instance witnessed twenty-four teeth successfully removed. So long ago as 1871 he contributed an article to the *British Journal of Dental Science*, which will be found in the April number of that year, in which occurs the following passage :—" In my own practice I have repeatedly extracted over a dozen teeth and roots of teeth (and in one favourable case eighteen were successfully removed) during the anæsthesia produced by one administration." It must be conceded that what has been practically demonstrated daily for a period of more than twenty years has passed beyond the realms of controversy or further discussion. The question as to whether, or not, it is desirable to extract any considerable number of teeth at one sitting must be answered by the circumstances of each particular case. Nervous shock has always to be reckoned with and must never be lost sight of. The prudent dentist will exercise his judgment in this respect with discretion. At the same time it must be borne in mind

that when gas is used there is a remarkable freedom from unpleasant after-effects compared with those usually experienced when other Anæsthetics are employed, the recovery from gas being rapid and complete. The advocacy of wholesale extractions is here repudiated ; cogent reasons may exist why not more than one or two teeth should be removed at the same time ; on the other hand there may be equally cogent reasons for not performing the operation piece-meal. Cases are constantly presenting themselves where it is most desirable, for obvious reasons, that a considerable number of teeth should be removed at the same operation. The majority of our patients are anxious this should be so ; and their wishes ought not to be disregarded in the absence of any special reasons to the contrary. After-effects from one extensive operation are less to be apprehended than from a succession of smaller ones. There are both dental surgeons and medical men who argue against the extraction of more than one or two teeth when nitrous oxide is employed, who in practice regularly clear an upper or lower jaw when chloroform or ether is used, or no anæsthetic at all ; and nothing is heard of the dangerous effects of nervous shock. When this is the case it is difficult to free the mind from suspicion that 'shock' is made a convenient bugbear, and raised for the purpose of concealing personal short-comings. The most serious objection to prolonged operations is not so much the dread of shock, as the comparative shortness of the anæsthetic effects of nitrous oxide allowing sufficient time for their accomplishment. We have proof of this—if proof were needed—in the persistent efforts that have been and are still being made to overcome this objection by combining the gas with ether, mixing it with oxygen, and other methods, each possessing its value, and each attended with disadvantages, which preclude its general use in the dental surgery. The difficulties arising from the element of time are best met by increased skill on the part of the operator, that this may be achieved it would be well to encourage young men who display expertness and aptitude for the work to apply themselves, in no half-hearted way, to the task of minimising their difficulties in the way suggested. Amongst the undesirable gas patients are the strongly bearded, but the trouble from this cause may be much reduced by a liberal application of soap and water so making the beard and moustache impervious to atmospheric air. With a little judicious

tact the difficulties met with from hysterical females may in most cases be overcome.

The experienced anæsthetist has nothing to fear from erotic or other untoward manifestations. The writer has not witnessed one such case during the last fifteen years. He is convinced these troubles are to be accounted for from faults, of a remedial nature, in the administration of the gas, rather than by attributing them to the temperament of the patients.

The writer repeats that he never objects to the presence of a medical man, on the contrary providing the object of his presence is properly understood ; but when it is for the purpose of superseding the dentist, or is meant to imply incapacity or inferiority on his part, such presence is not acceptable.

A qualified medical man is not a superior dentist any more than a qualified dentist is a superior medical man. The dentist who is specially qualified, and is an experienced anæsthetist, ought not to occupy an inferior position in his own operating room to a man who is not so qualified. The mere possession of a medical degree is no guarantee of dental knowledge.

The words of a high authority are borrowed and here quoted.* " We have again and again pointed out that as at present educated, medical men know absolutely nothing about dentistry and under such circumstances to call in the aid of a medical man to advise as to the proper performance of dental operations, is as absurd as it would be to appoint a lawyer to superintend the construction of one of H. M. Ships of War. We make no reflection on any medical man, we merely speak generally."

It is acknowledged that no other anæsthetic requires the same amount of care and skill in its exhibition as nitrous oxide, and it ought at all times to be under the supervision of a highly trained and experienced person, be he qualified dental surgeon or qualified medical man. In the writer's opinion nitrous oxide will not have taken its proper place in the dental surgery until it has banished all other anæsthetics. When the public has been fully educated to appreciate the merits of the gas, and when the Dentists themselves succeed in doing it full justice, it will become a rare thing to hear that an extraction has taken place without its aid. The valuable properties possessed by nitrous oxide for dental purposes can hardly be

* Editor of British Journal of Dental Science.

overrated ; on the other hand it has its disadvantages and difficulties, but none are insurmountable, and he who strives most successfully to overcome them will be the wisest and best rewarded practitioner.

Reflections from the Surgery.

A CASE OF CLOSURE OF JAW OF FORTY-THREE YEARS' STANDING.

Reported by Mr. J. FRANK COLYER, L.R.C.P., Lond.,
M.R.C.S., and L.D.S. Eng.

J. H. æt. 47, presented himself at the Dental Hospital complaining of pain in the region of the left upper bicuspid.

On examination it was found that the patient was unable to open the mouth more than one-eighth of an inch. On examining with the finger two strong fibrous bands were found one on either side running from the bicuspid region above to that below. The two lower incisors were absent having been removed for the purpose of enabling food to be placed in the mouth.

This state of affairs had continued since the patient was four years old and followed, according to his own account on a severe sore mouth dependent on scarlet fever, probably ulcerative stomatitis.

The patient was well nourished and appeared healthy. The case seems to be of interest, firstly because the closure appears to have been the result of an attack of ulcerative stomatitis, and secondly, because it shows how it is possible for one to get along fairly comfortably with a very small amount of masticating power.

No treatment was pursued, the patient objecting to that recommended.

British Journal of Dental Science.

LONDON, SEPTEMBER 16th, 1889.

THE HIGH ROAD TO THE DENTAL DIPLOMA.

It is a mistake to suppose that the calling of a dentist is anything but an arduous one. Like all good things it requires hard work, and much more than hard work it needs determination to master difficulties, to submit with patience to long hours of standing, to exercise constant self-control, and to learn by continual practice and thought how to gain that deftness of touch and decision in delicate manipulation which distinguishes the perfect dentist. To succeed, the student must feel, as well as appear, a gentleman, and recollect that a noble nature always combines extreme tenderness with strength and skill.

When assured that health and eyesight are good, and dentistry chosen as a profession, the boy has to pass some preliminary examinations in general education. There are a considerable number of these which vary not a little in severity and range of subjects required, and a list of them will be found in the supplement appended to this number. The examination, which is most highly recommended to students by the leading authorities on dental education is that conducted by the University of London for Matriculation of its undergraduates. It possesses the merit of including in its scope the subjects of chemistry and physics, and requires so thorough a knowledge of these matters as cannot but prove invaluable to the student in his after-career. The University of London not requiring residence offers a favourable

means for dental students who seek a *bona fide* English degree to achieve their object, and for this purpose matriculation clears the way.

The preliminary examination being passed, the next stage is the registry of the name as a dental student at the local office of the General Medical Council. As it is of supreme importance to acquire an insight into mechanical dentistry the student must then be apprenticed for three years to a dentist, and he will find three years barely enough to master this necessary branch of his profession. He can, however, if he desires it, pass eighteen months of the three years instruction in mechanical dentistry before the date of his registration as a student; but four years must be given to his studies after the date of passing the preliminary examination. The student must endeavour to gain as much general information as possible, during this period, and should he propose to take the diploma of the Conjoint Examining Board of the Royal Colleges of Physicians and Surgeons, the preliminary examinations in chemistry, materia medica, osteology, and physiology may be passed. He must above all things not take too much time from his bench work. As soon as the three years instruction in mechanical work are completed, lectures at a general hospital have to be attended for at least two winters and one summer session, making together eighteen months.

The special instruction of a recognised dental hospital can be carried on at the same time with the work at the general hospital, but must extend over two years. After the end of the fourth year subsequent to registration, if the student has duly completed the courses of study mentioned, he may present himself for examination for the licentiatehip of the Royal College of Surgeons (L.D.S.). With regard to the choice of special general hospitals it would be invidious to speak save in general terms when such excellent instruction can be obtained at so many schools. London has at the present time two highly satisfactory schools of dental surgery, and Guy's Hospital has provided for its students a fully equipped dental department where all the special subjects of

dentistry are taught and practical instruction given. Of the general hospitals some offer special facilities to students preparing for a dental diploma, whilst others train the student in precisely the same lines as his *confreres* whose aim is the medical profession, allowing him to seek his special dental instruction in special dental hospitals. That time and trouble are saved to the student who attends the general hospitals which are regarded more especially as affiliated to dentistry cannot be denied, but there are many counterbalancing advantages which may be urged on the other side. A thornless path too often engenders the crumpled rose leaf form of energy, which fails to call forth the individual's best powers of work and capacity for endurance. And again, the mixing with young men not working entirely on the same lines develops a breadth of thought and expansion of interests which are of unquestionable value in after life. During the youth's stay in town it is well that he should be under supervision, at all events for the first two or three years, and this can be obtained either at one of the many residential colleges connected with the general hospitals, or by placing him in the house of a dentist, or medical man. The deans of the respective schools keep lists of such homes and furnish to parents or friends information in detail, into which for obvious reasons we are unable to enter.

Too much care cannot be taken in the selection of the dentist into whose hands the student is put to acquire his mechanical knowledge. And it should be clearly understood that those who have the largest practices, or are most widely known are not always the best instructors. Many a man who himself is a great master in his art, possesses but little faculty of imparting knowledge to others. To this, however, there are many brilliant exceptions. Besides the London schools, there are excellent facilities for dental students, in the sister countries, as well as in the provinces. We must again refer to the supplement for fuller particulars concerning these schools and to their respective deans.

PRIVATE CLINIC AND DEMONSTRATION IN LONDON.—We are informed that Dr. Parmly Brown, Dr. H. A. Parr and Dr. George Evans, of New York, propose to give demonstrations during their stay in London. Dr. Parmly Brown will repeat his demonstrations of last year shewing his system of Porcelain Crown and Bridge work, and Gold Crown work, Contour fillings with the use of the electric mallet, depressed rubber dams, universal screw clamp and a new gas furnace for making porcelain bridges. Dr. Parr proposes to shew his system of removal Gold Bridge work and also a new tooth separator. Dr. Evans is announced to show his seamless ready made gold crown. Dr. Evans will also demonstrate the use of his root canal drier and the method of attaching gold crowns. Those who wish to attend the clinics will find full particulars in our advertisement columns.

POST GRADUATE TEACHING IN LONDON.—The National Dental Hospital has committed itself to a new departure in permitting the post graduate teaching to be carried on *pari passu* with the routine working of the Dental School connected therewith. It is, we believe, an open secret that Dr. George Cunningham's lectures upon operative dental surgery will be thrown open not only to advanced students of the school, but to practitioners unconnected therewith. The course is to be something between the ordinary college course and regular post graduate course, and will commence on Oct. 7th, at half past six p.m. Various interesting features, which are usually omitted in dental didactics, will find a place in Dr. Cunningham's lectures, and the course will doubtless be found a boon by practitioners desirous of keeping well abreast of the knowledge of the day.

Abstracts of British & Foreign Journals.

ITEMS OF INTEREST.

HINTS FOR THE LABORATORY.

Dr. JULIUS DEINELT, Alexandria, Va.

To prevent zinc dies from settling in the centre, pour out the first portion of metal rapidly, and as soon as the impression part of the mould is well filled, direct the stream of zinc more slowly to the centre, slowing more and more as the surface is reached—by which time the cast is beginning to harden on the outer margin—let the metal fall drop by drop; and as by this time the zinc is liquid in the centre only, continue the process till there is a slight bulge. When cooled, you will have a perfectly level die, with no chance of giving way in the centre, on account of its hollowness, as is so often the case. If an important tooth breaks off your plaster model, notch both ends slightly with the point of an old excavator, and having carefully removed the chips, so that the broken ends come together accurately, mix some oxyphosphate very thin, and apply to the broken parts, and then press them tightly together; set aside to dry. In an hour you may lift the model by the tooth alone, and it will not break. As a plaster model to be cast in zinc, for swaging, should not be less than three inches thick, always keep on hand two strips of oil-cloth—any old piece not too much worn will answer—each about 12 inches long by $3\frac{1}{2}$ wide, and cut in somewhat semicircular shape, so that it will come together funnel shape. Secure this where the ends overlap, by simple clasps made of sheet brass or tin, or iron wire, as used for holding two pieces of gold together for soldering, and having placed our impression on a piece of tin, to avoid mess place the rim of oil-cloth over it, the narrower part down, fill in the gaps around the impression with old cotton batting, and pour in the plaster to the height desired. When the plaster has hardened sufficiently, we draw the clasps, when the rim will come off clean, and trim. When vulcanite is used, single teeth are recommended; they are more pliable, and by proper manipulation produce a result unattainable by the use of gum sections. Modelling compound is said to be less disagreeable to patients

than plaster for impressions. Sticky wax, for holding in place clasps and teeth, previous to soldering, is best made of rosin two parts, and beeswax one part. Melt your rosin first, in a tin cup or an old dipper, then add the wax and stir till well mixed, and pour in a basin of cold water. Take up a piece about the size of a walnut at a time, and roll out with your hands on a smooth surface into pencils; care must be taken to keep the fingers moist, or the mixture will stick. To avoid chapping of hands after having soiled their fingers see that the entire hand is covered with water, and though you may be in the open air at the time, and careless in wiping your hands dry, they will be free from chapping the entire winter. Where most of the alveolar ridge has been absorbed—especially the lower—it is often difficult to keep the plate in place, but a firm adhesion may be obtained by the following method. After your plaster model is nearly dry, mix some plaster very thin, and with a fine camel's hair pencil, build up a half-round ridge, about the width of an ordinary knitting needle, all along the highest part of your model, or what is left of the original ridge, leaving off about a quarter of an inch from the end of the previously marked off plate, on both sides, or the object will be defeated. Never wet the model, or your plaster will run where it is not wanted, while, when dry, you can guide your plaster with the pencil and build up a neat and even ridge; a very important point in taking the model from the moulding sand afterward. The work should be performed neatly and rapidly, adding a little material at a time, till the ridge is finished to your satisfaction; when finally your plate is struck up, and while trying it in, you will be surprised to find how firmly it will adhere, by means of this narrow and continuous air-chamber. The same process will hold good in rubber plates, but the model should be more thoroughly dried to prevent the sticky base-plate from injuring the ridge. For troublesome shallow plates, already in the mouth, we would suggest the forming of a hollow ridge by means of an engine bur. We have used this process for many years, and have always found it a success in even the most desperate cases.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

DESTROYING NERVES.

To the Editor of the British Journal of Dental Science.

SIR,—In reply to a note under the above heading, in your last issue, by Dr. L. C. Bryan, of Basle, will you allow me to point out, that by the special process of manufacture adopted by me, in the preparation of my “Nerve Destroying Paste,” not only is the Arsenious acid, which it contains among other things, in the *very finest possible* state of powder, but much of it is actually in solution.

I am, Sir,

Yours truly,

J. H. BALDOCK.

South Norwood, S.E.

Sept. 7th, 1889.

Hospital Reports.

MONTHLY STATEMENT of operations performed at the Dental Hospital of London, Leicester Square, from August 1st to August 31st, 1889 :—

Extractions	Adults	.	.	.	.	.	.	.	1016
	Children under 14	.	.	.	.	.	.	.	462
	Under Gas	.	.	.	.	.	.	.	738
Stoppings	Gold	.	.	.	.	.	.	.	110
	Plastic.	.	.	.	.	.	.	.	578
Dressings	.	.	.	.	.	.	.	.	130
Advice	.	.	.	.	.	.	.	.	110
Irregularities of the Teeth	.	.	.	.	.	.	.	.	45
Scaling, Pivots, and Dressings	.	.	.	.	.	.	.	.	100
Total									3289

A. H. SMITH,

A. R. COLYER,

F. C. PORTER,

} *House Surgeons.*

STATEMENT of operations performed at the National Dental Hospital, from July 31st to August 31st, 1889:—

Number of patients attended	1880
Extractions { Children under 14	381
{ Adults	925
Under Nitrous Oxide.	877
Gold Stoppings	61
Other Stoppings	223
Advice and Scaling	419
Irregularities	58
Miscellaneous	122
Total	2866

EDGAR A. N. FIELD, } *House Surgeons.*
ARNOLD PRAGER }

Work done at the Victoria Dental Hospital during the month of August 1889:—

Number of patients attended	901
Extractions { Children under 14	759
{ Adults	88
Under Nitrous Oxide	48
Gold Stoppings	49
Other Stoppings	228
Advice	
Total	6633

CHARLES H. SMALE, *House Surgeon.*

ERRATUM.—In the article Notes on Nitrous Oxide—the sentence beginning—line 17, from bottom page 752, to eighth line from top of ensuing page should be enclosed in inverted commas, and should be credited to Dr. Silk, being an extract from his book.

DENTAL STUDENTS' SUPPLEMENT.

SEPTEMBER 16TH, 1889.

I.—THE LICENSING CORPORATIONS.

Comparative Summary of Regulations for the License in Dental Surgery.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
I.—PRELIMINARY EXAMINATION	Compulsory on all who commenced their Professional Education after July 22nd, 1878. Must be registered as a Dental Student at the office of the General Medical Council, 299, Oxford St., London, W.	Compulsory on all who commenced their Professional Education after August 1st, 1878.	Compulsory on all, except those who have passed one equivalent examination.	Compulsory on all who commenced the Professional Education after August 1st, 1878.
2.—AGE at which the Candidate may present himself	Twenty-one.	Twenty-one.	Any age, but diploma cannot be granted until he is twenty-one.	Twenty-one.
3.—DURATION OF PROFESSIONAL EDUCATION.....	Four years subsequent to registration.	Four years.	Four years.	Four years.
4.—COURSES OF LECTURES, &c., to be attended at a recognised School :—	Two Courses, or one Course and twenty Lectures on Head and Neck.	One Winter Course.	One Course.	Two Courses, or one Course and twenty Lectures on Head and Neck.

4—COURSES OF LECTURES, &c. (<i>continued</i>)—	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Physiology	One Course.	One Course of 50 Lectures.	One Course.	One Six months' Course.
Surgery	Ditto.	One Winter Course.	Ditto.	Ditto.
Medicine	Ditto.	Ditto.	None.	Ditto.
Chemistry	Ditto.	Ditto.	One Course.	Ditto.
Materia Medica	Ditto.	One three months' Course.	Ditto.	One three months' Course.
Dissections and Demonstra- tions, or	} Nine months.	Nine months.	Two Courses.	Nine months.
Dissections and Anatomy of Head and Neck		Nine months.	One Course.	One Course.
Practical Chemistry and Metallurgy	One Course of each.	One three months' Course.	One Course.	Three months. Twelve Lectures.
Practice of Surgery, and Clinical Lectures	Two Winter Sessions.	One six months' Course, or two three months' Courses.	Two Winter Sessions.	Twenty-four Lectures. Twenty Lectures.
Dental Anatomy and Phy- siology	Two Courses.	One Course.	None.	Twelve Lectures on Demon- strations.
Dental Surgery & Pathology Metallurgy (unless specially included in Practical Che- mistry)	Ditto.	Ditto. One Course of not less than twelve Lectures.	Two Courses.	Twelve Lectures.
Dental Mechanics	Ditto.	One Course.	Two Courses.	
Practical Instruction in Mechanical Dentistry ...	Three years under a compe- tent Practitioner, eighteen months of which may be previous to Registration	Three years under a Regis- tered Dental Practitioner.	Three years under a Re- gistered Dental Licen- tiate.	Three years under a Regis- tered Practitioner.
Practice of Dental Surgery in a recognised Dental Hospital, or in the Dental Department of a recog- nised General Hospital...	Two years. £10 10s. over and above stamp duty.	Two years. £10 10s.	Nine months. £10 10s.	Two years. £10 10s.
5—FEE				

6—LEAST period during which unsuccessful Candidates are referred to their studies	Six months.	Three months.
7—PARTICULARS OF EXAMINATION	(A) <i>Written.</i> On General Anatomy and Physiology. General Pathology and Surgery (both with especial reference to Dental Practice.) (B) <i>Oral:</i> On all subjects in the Curriculum. Preparations, Casts and Drawings. Fillings. Cases for Diagnosis, instruments, &c.	<i>Written and Oral:</i> On all the subjects of the Curriculum. Preparations, Microscopes, and other appliances.
8—DATE OF EXAMINATION	May and November.	1889—October 17—19. 1890—May 1—3. " October 9—11.
9—MODIFIED CONDITIONS OF ADMISSION TO EXAMINATION <i>sine curriculo:</i>	Candidates must have been in Practice or have commenced Professional Education, prior to September, 1859 (the date of the Dental Charter.) One of moral character signed by two members of the College or two Licentiates of the Licensing Bodies in the country where the education was received.	<i>Written, Oral, & Practical:</i> 1st Part—Anatomy, Physiology, Chemistry, and Metallurgy. Second Part—Surgery, Medicine, Materia Medica and special Dental subjects. Practical Examination at a Dental Hospital. Candidates are to bring Examinators, Files and Plugging Instruments.
(a) Conditions of eligibility.	I. Professional Examinations Tuesday, Oct. 29, 1889. " April 22, 1890. II. Professional Examinations. Following Thursday.	Quarterly. Candidates must be registered Dental Practitioners in practice before 1878.
(b) Certificates, &c., required (<i>continued</i>):		Certificates of moral and professional character signed by two Registered Medical Practitioners, and by two Registered Dentists.

9—MODIFIED CONDITIONS OF ADMISSION TO EXAMINATIONS—(contd.): (b) Certificates, &c., required— (continued):	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
	Name. Age. Professional address. Date of commencing Dental practice. Whether a Member, Licentiate or Graduate of any British College of Physicians, College of Surgeons, or University, with date of licence, &c. Of what learned societies a Member. Whether in Dental Practice separately, or if not, in connection with what business. Whether he has employed Advertisements or Public Notice. Particulars of Professional Education. Same as ordinary Examination. Ten guineas over and above stamp duty. MR. F. G. HALLETT, Examination Hall, Victoria Embankment, London, W.C.		Name. Age. Address. Date of commencing practice and whether such practice has been carried on in conjunction with any other business, and if so with what business. Professional status.	
(c) Manner of Examination Fee For further information apply to Secretary.		JAMES ROBERTSON, Solicitor Interim Secretary and Treasurer. 1, George Square, Edinburgh	Particulars of Professional Education. £21. JOHN BRENNEN, Esq., Royal College of Surgeons, Dublin.	ALEX. DUNCAN, Esq., Faculty of Physicians and Surgeons, Glasgow.

II. PRELIMINARY EXAMINATION.

REGULATIONS OF GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or Dental Student unless he shall have previously passed at one or more Examinations, a preliminary Examination in the subjects of General Education as specified in the following List :—

1. English Language, including Grammar and Composition.
2. Latin, including Grammar, Translation from the specified authors, and translation of easy passages not taken from such authors.
3. Elements of Mathematics, comprising (a) Arithmetic, including Vulgar and Decimal Fractions; (b) Algebra, including simple Equations; (c) Geometry, including the first Book of Euclid, with easy questions, on the subject matter of the same.
4. Elementary Mechanics of Solids and fluids, comprising the Elements of Statics, Dynamics, and Hydrostatics.
5. One of the following Optional Subjects :—
(a) Greek; (b) French; (c) German; (d) Italian; (e) any other Modern Language; (f) Logic; (g) Botany; (h) Elementary Chemistry.

List of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards Preliminary Education :—

I. UNIVERSITIES IN THE UNITED KINGDOM.

UNIVERSITY OF OXFORD :—

1. Junior Local Examinations : Certificate to include Latin and Mathematics, and also one of these optional subjects, Greek, French, German.
2. Senior Local Examinations : Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examinations for a Degree in Arts.

UNIVERSITY OF CAMBRIDGE :—

9. Junior Local Examinations ; Certificates to include Latin and Mathematics, and also one of the following Junior Local Examinations ; Certificates to optional subjects :—Greek, French, German.
7. Senior Local Examinations ; Certificate to include Latin and Mathematics.

* * * In the case of Students in Universities with a prolonged curriculum, where the Examination in Mechanics required for their Degree is taken at a more advanced period of study than before commencing Medical Education, Registration can be effected only on having passed the Examination in Mechanics, but their registration may be then antedated to the period at which the Preliminary was passed.

CAMBRIDGE—*Continued.*

8. Higher Local Examinations.
9. Previous Examination.
10. Examination for a Degree in Arts.

UNIVERSITY OF DURHAM:—

11. Examination for Certificate of Proficiency.
12. Examination for Students at the end of their first year.
13. Examination for a Degree in Arts.

UNIVERSITY OF LONDON:—

14. Matriculation Examination.
15. Preliminary Scientific (M.B.) Examination.
16. Examination for a degree in Arts or Science.

VICTORIA UNIVERSITY:—

17. Preliminary Examination; Latin to be one of the subjects.
18. Entrance Examinations in Arts, to include all the subjects required.

UNIVERSITY OF EDINBURGH:—

19. Local Examinations (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
20. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geography, Latin, and also one of the following optional subjects:—Greek, French, German.
21. Preliminary Examination for graduation in Science or Medicine and Surgery.
22. Examination for a Degree in Arts.

UNIVERSITY OF ABERDEEN:—

23. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
24. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
25. Preliminary Examination for graduation in Medicine or Surgery.
26. Examination for a Degree in Arts.

UNIVERSITY OF GLASGOW:—

27. Local Examinations (Junior Certificate); Certificate to include all the subjects required.
28. Local Examination (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following subjects:—Greek, French, German.
29. Preliminary Examination for graduation in Medicine or Surgery.
30. Examination for a Degree in Arts.

UNIVERSITY OF ST. ANDREWS;—

31. Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects:—Greek, French, German.
32. Local Examinations (Junior Certificate), to include all the subjects required.
33. Preliminary Examination for Graduation in Medicine or Surgery.
34. Examination for a Degree in Arts.

UNIVERSITY OF DUBLIN :—

35. Public Entrance Examination.
36. General Examination at end of Senior Freshman year.
37. Examination for a Degree in Arts.

QUEEN'S UNIVERSITY IN IRELAND :—

38. Local Examination for Men and Women ; Certificates to include all the subjects required by the General Medical Council.
39. Entrance or Matriculation Examination.
40. Previous Examination for B.A. Degree.
41. Examination for a Degree in Arts,

ROYAL UNIVERSITY OF IRELAND :—

42. Matriculation Examination.

OXFORD AND CAMBRIDGE SCHOOLS' EXAMINATION BOARD :—

43. Certificate, to include the following subjects, an adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects :
 - (a) Arithmetic, including Vulgar and Decimal Fractions ;
 - (b) Algebra, including Simple Equations ;
 - (c) Geometry, including the first two books of Euclid ;
 - (d) Latin, including Translation and Grammar ;
 - (e) Also one of these optional subjects (Greek, French, German).

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE
“MEDICAL ACT.”

APOTHECARIES' SOCIETY OF LONDON :—

44. Examination of Arts.

ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF EDINBURGH :—

45. Preliminary (combined) Examination in General Education.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW :—

46. Preliminary Examination in General Education.

ROYAL COLLEGE OF SURGEONS OF IRELAND :—

47. Preliminary Examination ; Certificate to include Mathematics.

III.—EXAMINING BODIES IN THE UNITED KINGDOM NOT INCLUDED IN SCHEDULE (A) TO THE “ MEDICAL ACT ” (1858)

COLLEGE OF PRECEPTORS :—

48. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and either a modern language, or Greek, or Chemistry, or Botany, or Zoology, having been taken.

QUEEN'S COLLEGE, BELFAST :—

49. Matriculation Examination.

QUEEN'S COLLEGE, CORK :—

50. Matriculation Examination.

QUEEN'S COLLEGE, GALWAY :—

51. Matriculation Examination.

INTERMEDIATE EDUCATION BOARD OF IRELAND :—

- | | |
|------------------------------|--|
| 52. Junior Grade Examination | } Certificate in each case to include all the subjects required. |
| 53. Middle Grade Examination | |
| 54. Senior Grade Examination | |

ST. DAVID'S COLLEGE, LAMPETER :—

55. Responsions Examination, to include all the subjects required.

EDUCATIONAL INSTITUTE OF SCOTLAND :—

56. Preliminary Medical Examination.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN :—

57. Preliminary and Minor Examinations (*pro tanto*).

PHARMACEUTICAL SOCIETY OF IRELAND :—

58. Preliminary Examinations (*pro tanto*).

SCOTCH EDUCATION DEPARTMENT :—

59. Leaving Certificates in each Grade and in Honours.

IV.—CERTAIN EXAMINATIONS OF INDIAN, COLONIAL AND FOREIGN UNIVERSITIES AND COLLEGES.

REGISTRATION OF DENTAL STUDENTS.

Every Dental Student shall be registered in the manner hereinafter prescribed by the General Medical Council.

No Dental Student shall be registered until he has passed a Preliminary Examination, as required by the General Medical Council,* and has produced evidence that he has commenced Medical Study.

The commencement of the course of Professional Study recognised by any of the Qualifying Bodies shall not be reckoned as dating earlier than fifteen days before the date of Registration.

Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by attendance upon professional lectures, before July 22nd, 1878 (when Dental Education became compulsory, shall not be required to produce evidence of having passed a Preliminary Education.

Pupils who have been articulated to their fathers, or to brothers—with whom money transactions would be nominal—shall, in all other respects, be considered to be in the same position in regard to registration as those pupils provided for in the first part of Section 37 of the *Dentists' Act*, who have paid premiums for instruction.

Candidates for a Diploma in Dental Surgery shall produce certificates of having been engaged during four years in Professional Studies, and of having received three years' instruction in Mechanical Dentistry from a registered Practitioner.

One year's *bona fide* apprenticeship with a registered Dental Practitioner, after being registered as a Dental Student, may be counted as one of the four years of Professional Study.

The three years of instruction in Mechanical Dentistry, or any part of them, may be taken by the Dental Student either before or after his registration as a Student; but no year of such Mechanical instruction shall be counted as one of the four years of Professional Study unless taken after registration.

The privilege provided by the first Clause of Section 37 of the *Dentists' Act*, for persons whose Articles of Apprenticeship expired before January 1, 1880, shall be extended to all persons whose Articles had begun two years before that period.

* Exception may be made in the case of a Student from any Indian, Colonial, or Foreign University or College, who shall have passed the Matriculation or other equivalent Examination of his University or College, provided such Examination fairly represents a standard of General Education equivalent to that required in this country.

III.—EDUCATIONAL BODIES.

LONDON.

DENTAL HOSPITAL OF LONDON, AND LONDON
SCHOOL OF DENTAL SURGERY,
LEICESTER SQUARE.

HOSPITAL STAFF.

Consulting Physician—Sir J. RISDEN BENNETT, M.D., LL.D., F.R.S.*Consulting Surgeon*—CHRISTOPHER HEATH, F.R.C.S.*Consulting Dental Surgeons.*SAMUEL CARTWRIGHT, F.R.C.S., L.D.S., SIR JOHN TOMES, F.R.S.
F.R.C.S., L.D.S.*Dental Surgeons.*

- 9 a.m.—Monday ... C. E. TRUMAN, M.A., M.R.C.S., L.D.S.
 „ Tuesday ... R. H. WOODHOUSE, M.R.C.S., L.D.S.
 „ Wednesday ... GEORGE GREGSON, M.R.C.S., L.D.S.
 „ Thursday ... STORER BENNETT, L.R.C.P., F.R.C.S., L.D.S.
 „ Friday ... CLAUDE ROGERS, M.R.C.S., L.D.S., D.M.D., Harvard.
 „ Saturday ... F. CANTON, L.R.C.P., M.R.C.P., L.D.S.

Assistant Dental Surgeons.

- „ Monday ... LEONARD MATHESON, L.D.S.
 „ Tuesday ... W. HERN, M.R.C.S., L.D.S.
 „ Wednesday ... E. LLOYD WILLIAMS, L.R.C.P., M.R.C.S., L.D.S.
 „ Thursday ... GEO. PARKINSON, M.R.C.S., L.D.S.
 „ Friday ... LAWRENCE READ, L.D.S.
 „ Saturday ... W. PATERSON, F.R.C.S., L.D.S.

Administrators of Anæsthetics.

- 9.30 a.m.—Monday ... DUDLEY W. BUXTON, M.D., B.S., M.R.C.P.
 „ Tuesday ... FREDERICK HEWITT, M.D.
 „ Wednesday ... J. MILLS, M.R.C.S.
 „ Thursday ... F. WOODHOUSE BRAINE, F.R.C.S.
 „ Friday ... T. BIRD, M.A., M.R.C.S.
 „ Saturday ... G. H. BAILEY, M.R.C.S.

*Demonstrators.*CHARLES F. RILOT, L.D.S.
E. LATCHMORE, L.D.S.*Medical Tutor*.—H. BALDWIN, M.R.C.S., L.D.S.*House Surgeons*.—MESSRS. SMITH, PORTER, COLYER.*Assistant House Surgeons.*

MESSRS. HORDERN, PREEDY.

Demonstrations.—The Medical Officers will make every effort to give Demonstrations on cases selected from time to time, every morning during the Lecture Season: and at the end of the Course those gentlemen who have attended the Demonstrations to the satisfaction of the Medical Officers will be permitted to perform operations at the Hospital under the supervision of the Medical Officers and the House Surgeon.

Dresserships for cases of Extractions.—The appointments are held for two months, and consists of six senior Dresserships for extractions under anæsthetics, and eighteen Junior Dresserships for ordinary extractions.

The Senior Dressers will be selected from those pupils only who have entered fully both to the practice and lectures of this Hospital, and also to the Course required by the College of Surgeons for the Licence in Dental Surgery at one of the General Hospitals.

MEDICAL SCHOOL.

The WINTER SESSIONS will commence on Oct. 1st. 1889.

The SUMMER SESSION will commence in May, 1890.

LECTURES.

Dental Surgery and Pathology, —MR. STORER BENNETT.

Dental Anatomy and Pathology (Human and Comparative), by ARTHUR UNDERWOOD, M.R.C.S., L.D.S.

MEDICAL TUTOR.

The Medical Tutor attends on four days in the week, from 5 to 7 p.m., for two months previous to two of the Annual Examinations. His classes are open to all Students, and are intended to assist those who are preparing for their examinations at the College of Surgeons; generally speaking, to guide and direct the studies of the pupils, and prepare them in the subjects for the Examinations.

FEES.

GENERAL FEE FOR THE SPECIAL LECTURES REQUIRED BY THE CURRICULUM.

Viz., two Courses on Dental Anatomy, two Courses on Dental Surgery, two Courses on Mechanical Dentistry, and one Course of Metallurgy, £15 15s.

Fee for the Two Years' Practice of the Hospital required by the Curriculum, £15 15s.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £31 10s.

Students who perform Operations for Filling Teeth must provide their own Instruments for the same.

Additional Fees for a General Hospital for the two years, to fulfil the requirements of the Curriculum, vary from £40 to £50.

PRIZES.

The Prize-day will in future be held in July.

1. Prizes are awarded by the Lecturers for the best examinations in the subjects of their respective courses, at the end of the Summer and Winter Sessions.

2. Arrangements have been made for a prize in Operative Dentistry, in the competition for which each candidate is entrusted with the care of a mouth, which he shall, if not impracticable, set thoroughly in order.

3. A prize of the value of five guineas is also given by Messrs. Ash and Sons for the best essay on a surgical subject connected with the mouth.

4. A scholarship of the value of £20 has been founded by Sir Edwin Saunders, and will be awarded to the Student who has obtained the largest number of First Class Prizes during the Winter and Summer Sessions preceding the July in which the award takes place.

Note.—The Medical Committee have resolved “that the holder of the Saunders Scholarship be admitted without additional fee to the extra year of Hospital practice.”

The Dean requests that all communications relating to the Medical School may be addressed to him at the Hospital, where he will attend in the afternoons, from Sept. 26th to Oct. 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.

MORTON SMALE, M.R.C.S., L.D.S., L.S.A., *Dean*.

NATIONAL DENTAL HOSPITAL AND COLLEGE, GREAT PORTLAND STREET, W.

HOSPITAL STAFF.

Consulting Physicians.

B. W. RICHARDSON, M.A., M.D., F.R.S.

W. H. BROADBENT, M.D., F.R.C.P.

Consulting Surgeons.

SIR SPENCER WELLS, BART., F.R.C.S. CHRISTOPHER HEATH, F.R.C.S

Consulting Dental Surgeon.

SIR EDWIN SAUNDERS, F.R.C.S.

Dental Surgeons.

Monday...	...	F. HENRI WEISS, L.D.S., Eng.
Tuesday...	...	ALFRED SMITH, L.D.S., Eng.
Wednesday	...	G. A WILLIAMS, L.D.S., Eng.
Thursday	...	A. F. CANTON, L.D.S., Eng.
Friday ...	...	H. G. READ, M.R.C.S., L.R.C.P., L.D.S., L.S.A., D.M.D., Harvard.
Saturday...	...	HARRY ROSE, L.D.S., Eng.

Assistant Dental Surgeons.

Monday ...	...	WILLOUGHBY WEISS, L.D.S., Eng.
Tuesday ...	...	R. DENISON PEDLEY, F.R.C.S., Edin.; M.R.C.S., L.D.S. Eng.
Wednesday	...	MARCUS DAVIS, L.D.S., Eng.
Thursday	...	G. READ, L.D.S., Eng.
Friday ...	...	C. W. GLASSINGTON, M.R.C.S., L.D.S., Edin.
Saturday	...	W. R. HUMBY, L.D.S., Eng.

House Surgeon—E. A. H. FIELD, L.D.S., Eng.

Assistant House Surgeon—G. M. KOEVIL.

Assistant Demonstrator—J. N. DUNLOP.

Anæsthetists.

HENRY DAVIS, M.R.C.S., L.S.A.

JAMES MAUGHAN, M.D., L.R.C.P., M.R.C.S.

S. E. PEDLEY, M.R.C.S., L.R.C.P., L.D.S., Eng.

SIDNEY SPOKES, M.R.C.S., L.D.S., Edin.

CHAS. H. BARKLEY, L.R.C.P. & S., Edin.

LECTURERS.

<i>Dental Anatomy and Physiology</i>	SIDNEY SPOKES, M.R.C.S., L.D.S. Edin.
<i>Dental Surgery and Pathology</i>	WILLOUGHBY WEISS, L.D.S., Eng.
<i>Dental Mechanics</i>	HARRY ROSE, L.D.S., Eng.
<i>Dental Metallurgy</i>	W. LAPRAIK, F.I.C., F.C.S.
<i>Operative Dental Surgery</i> ...	GEORGE CUNNINGHAM, B.A., D.M.D., L.D.S., Eng.
<i>Dental Materia Medica</i>	C. W. GLASSINGTON, M.R.C.S., L.D.S., Ed.
<i>Elements of Histology</i>	JAMES MAUGHAN, M.D., L.R.C.P.,
<i>Demonstrator of Dental</i>	M.R.C.S.
<i>Mechanics</i>	W. R. HUMBY, L.D.S., Eng.

The hospital is open for the reception of patients every week-day, from 9 o'clock till 11 o'clock a.m. The House Surgeon and Assistant House Surgeon attend daily, from 9 a.m. till 2 o'clock p.m.

Dresserships in the Extraction Room.

These appointments are held for three months by six senior and twelve junior students of the Hospital. The respective dressers for each day are required to be in attendance from 9 o'clock till the conclusion of the practice; and they will be under the direction of the Dental Surgeon of the day, and of the House Surgeon.

Clinical Lectures and Demonstrations.

Each medical officer will give clinical lectures, when opportune, during the ensuing year. Clinical lectures will also be given from time to time on cases of special interest; and also demonstrations upon the preparing and filling of cavities and other operations upon the teeth and contiguous parts.

Attendance and Examination of Students.

A register is kept of the attendance of students at the Hospital practice and lectures. An attendance of full two years at Hospital practice is required by the College of Surgeons of England; and no schedule will be signed for any lectures of which less than two-thirds have been attended. Class examinations are held frequently during the several courses, to test the progress and attention of the pupils; and at the end of each course of lectures a written examination is held. An insufficient attendance at lectures disqualifies the student for receiving any prize of that year.

Tutorial classes are held to prepare for the final examinations, students who have, at this school, complied with the Dental portion of the Curriculum.

Number of cases attended during the year 1888, 40648.

LECTURES.

WINTER SESSION, COMMENCING ON MONDAY, Oct. 1st, 1888.

Dental Anatomy and Physiology, by Sidney Spokes, M.R.C.S., L.D.S., Edin. On Tuesdays and Thursdays, at 6 p.m., during October, November, and December.

Operative Dental Surgery, by George Cunningham, B.A., D.M.D., L.D.S., Eng. On Mondays, at 6.30 p.m., during October, November and December. (Free to Students of the Hospital and College.)

Dental Materia Medica and Therapeutics, by Chas. W. Glassington, M.R.C.S., L.D.S., Edin. On Tuesdays, at 7.30 p.m., during October, November and December. (Free to students of the College.)

Dental Metallurgy, by W. Lapraik, F.I.C., F.C.S. On Tuesdays at 7.30 p.m., during January, February, and March.

Dental Mechanics, by Harry Rose, L.D.S., Eng. On Mondays, at 7 p.m., during January, February and March.

Demonstrations on Dental Mechanics, by W. Robinson Humby, L.D.S., Eng. On Wednesdays, at 7 p.m., during January, February, and March. (Free to students of the College.)

SUMMER SESSION, 1890.

Dental Surgery and Pathology, by Willoughby Weiss, L.D.S., Eng. On Mondays and Thursdays, at 6 p.m., during May, June and July.

Elements of Histology, by James Maughan, M.D., L.R.C.P., M.R.C.S. On Mondays and Thursdays, at 5 p.m., during May, June, and July. (Free to students of the College.)

FEES.

GENERAL FEE FOR SPECIAL LECTURE REQUIRED BY THE CURRICULUM OF THE ROYAL COLLEGE OF SURGEONS IN ENGLAND. £12 12s.

Fees to single Courses.	One Course.	Two Courses.
Dental Anatomy and Physiology	£2 12 6	£4 4 0
Dental Surgery and Pathology	2 12 6	4 4 0
Dental Mechanics	2 12 6	4 4 0
Dental Metallurgy	3 3 0	5 5 0
*Operative Dental Surgery... ..	2 12 6	...
*Dental Materia Medica	2 2 0	...
*Elements of Histology	1 1 0	...
*Demonstrations on Dental Mechanics ...	1 1 0	...

*These lectures are free to students of the College who have fully entered for the Special Lectures.

Hospital Practice to Registered Practitioners (six months), £7 7s. Ditto (twelve months), £9 9s.

Fee for the two years' Hospital Practice required by the Curriculum, £12 12s. Perpetual Fee, £15 15s.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £25 4s. Perpetual Fee, £31 10s.

PRIZES.

Six Prizes, in Medals, are open for competition among the students of the College, at the end of each Course of Lectures, on the following subjects, viz. : Dental Anatomy, Dental Surgery, Dental Mechanics, Metallurgy, Operative Dental Surgery, and Dental Materia Medica.

Certificates of Honour will be awarded to those Students who show superior proficiency in any of the classes.

The Rymer Gold Medal for General Proficiency, value £5, will be awarded annually to the most distinguished Student of the year. His general conduct and attendance must have been in every respect satisfactory. At the time of the special examination for the Rymer Medal the Student must not hold any qualification. The medal will be awarded on the understanding that the Student completes the Dental Curriculum.

The public Distribution of Prizes will take place during the Winter Session.

F. HENRI WEISS, *Dean*.

GUY'S HOSPITAL.

THE STAFF OF THE DENTAL SCHOOL.

Dental Surgeon—F. NEWLAND-PEDLEY, F.R.C.S., L.D.S.

Senior Assistant Dental Surgeon :

W. A. MAGGS, L.R.C.P., M.R.C.S., L.D.S.

Assistant Dental Surgeons :

J. MANSBRIDGE, L.D.S.

H. MURRAY, L.D.S.

H. L. PILLIN, L.D.S.

G. O. RICHARDS, M.R.C.S., L.D.S.

R. W. ROUW, L.R.C.P., M.R.C.S.,

L.D.S.

Anæsthetists :

F. W. COCK, M.D.

J. F. SILK, M.D.

LECTURERS.

Dental Surgery.—Mr. NEWLAND-PEDLEY.

Dental Anatomy and Physiology.—Mr. MAGGS.

Dental Mechanics.—Mr. RICHARDS.

Metallurgy.—C. E. GROVES, F.R.S.

Anæsthetics.—T. BIRD, M.A., Oxon., M.R.C.S.

DEMONSTRATOR :

Dental Microscopy.—Mr. MANSBRIDGE.

Tutor.—Mr. ROUW.

Dean.—DR. PERRY.

FEES.

A Ticket which gives admission to the General and Special Lectures and Demonstrations, and to the Hospital and Dental Practice, requisite for the Diploma in Dental Surgery of the Royal College of Surgeons of England may be obtained :—

1. By the payment of £70 on entrance.
2. By two payments of 40 guineas, and 30 guineas at the beginning of the First and Second Years respectively.

A Ticket which gives admission to the Special Lectures and Demonstrations and Dental Practice only may be obtained for 30 guineas paid on entrance.

The inclusive Fee for Students entering for the M.R.C.S., L.R.C.P., and L.D.S., Eng., is £150 paid in one sum or 150 guineas paid in three annual instalments at the commencement of each academical year:—First Year, £60, Second Year, £60, Third Year, £37 10s.

EDINBURGH.

DENTAL HOSPITAL AND SCHOOLS.

Consulting Physician—ALEX. PEDDIE, M.D., F.R.C.P.E.

Consulting Surgeon—JOSEPH BELL, M.D., F.R.C.S.E.

Consulting Dental Surgeon—JOHN SMITH, M.D., F.R.C.S.E.

Dean and Hon. Treasurer—W. BOWMAN MACLEOD, L.D.S.

Dental Surgeons.

ANDREW WILSON, L.D.S., Edin.

J. STEWART DURWARD, L.D.S., Ed.

MALCOLM MACGREGOR, L.D.S., Edin.

JAMES MACKINTOSH.

GEORGE W. WATSON, L.D.S., Edin.

JAMES LINDSAY, L.D.S., Edin.

Assistant Dental Surgeons.

WILLIAM FORRESTER

WM. WILSON, M.B., L.D.S., Edin.

JOHN S. AMOORE, L.D.S., Eng.

JOHN TURNER, L.D.S., Edin.

J. GRAHAM MUNRO, L.D.S., Edin.

DAVID MUNROE, L.D.S., Edin.

Chloroformists.

R. STEWART, M.A., M.B. & C.M.

W. KEILLER, L.R.C.P. & S., Edin.

DENTAL SCHOOL.

LECTURES.

Dental Anatomy and Physiology (Human and Comparative) by ANDREW WILSON, L.D.S. (Edin.)—These Lectures will be delivered on the evenings of Tuesday and Friday, at 8 o'clock, commencing on 15th November, 1889. The course, consisting of twenty four Lectures, will be illustrated by preparations, models, diagrams, microscopical specimens, etc.

Dental Surgery and Pathology, by GEORGE W. WATSON, L.D.S. (Edin.)—These Lectures will be delivered on the mornings of Tuesday and Friday, at 8 o'clock, during the Summer Session, commencing May, 1890. The Course, consisting of twenty-two Lectures, will be illustrated by preparations, models, diagrams, microscopical preparations, etc.

Mechanical Dentistry, by W. BOWMAN MACLEOD, L.D.S. (Edin.)—The Lectures will commence on 13th November, 1889, at 8 p.m., and be continued every Wednesday thereafter till the Course of at least twelve Lectures is concluded.

Practical Mechanics.—Assistant Demonstrator, J. STEWART DURWARD, L.D.S. (Edin.)—In addition to the Systematic Lectures, there will be given, during the Session, Demonstrations on Dental Mechanics, and each Student will be expected to prepare the mouth, take the impression, make the denture, and insert the same in at least four cases. The Demonstrations will be spread over the two years of Hospital practice, and will be given as occasion serves. Students will require to furnish their own hand tools.

In the various classes prizes will be offered for competition.

General Fee for the Hospital Practice and special Lectures required by the Curriculum.—Hospital Practice, £15 15s. One Course each of Dental Anatomy, Dental Surgery, and Mechanical Dentistry and Demonstrations, £9 15s.—£25 10s.

Fees to separate Classes.—Dental Anatomy, Dental Surgery, Mechanical Dentistry, £3 5s. each.

The Hospital Practice and Lectures qualify for the Dental Diploma of the Royal College of Surgeons, Edinburgh, and also for that of the other Licensing Bodies. Second Courses of the Lectures, as required by the Royal College of Surgeons of England, £2 4s.

For further information apply to the Dean, who will be found at the Hospital every Wednesday morning between 9 and 10 o'clock.

THE SESSION 1889-90 OPENS OCTOBER 17TH, 1889.

General Fee for the Hospital Practice and special Lectures required by the Curriculum.

Hospital Practice, Two Years	£15	15	0	
One Course of 24 Lectures in Dental Anatomy ...	}	9	15	0
" 22 " " Surgery ...				
" 12 " " Mechanics				
Total.....	£25	10	0	

For further particulars, apply to the Dean, 5, Lawnston Lane, Edinburgh.

GLASGOW.

DENTAL HOSPITAL AND SCHOOL.

4, CHATHAM PLACE, STERLING ROAD.

Hon. Consulting Physician.—W. T. GAIRDNER, M.D.

Hon. Consulting Surgeon.—SIR G. H. B. MACLEOD.

Chloroformists.—DRS. BROWN, CAMPBELL and ANDERSON.

Dental Surgeons.

J. A. BIGGS, L.D.S.

W. S. WOODBURN, L.D.S., F.P.S.G.

REES PRICE, L.D.S., Eng.

JAMES CUMMING, L.D.S., Glas.

J. R. BROWNLIE, L.D.S., M.R.C.P., Eng.

J. C. WOODBURN, M.D.

Assistant Dental Surgeons.

W. F. MARTIN, L.D.S.

ALEXANDER WHITE, L.D.S. (Glas.)

JAMES CAMERON, L.D.S., (Glas.)

W. HOLT WOODBURN, L.D.S.

Dental House Surgeon.—

The Hospital is open daily except Sunday, from 5 p.m. till 7 p.m.

The work of the Hospital is conducted as far as possible, by the Students, under the supervision of the Dental Officer of the day. Cases of special interest will be made the subject of clinical instruction or demonstration as they occur.

The practice of the Hospital may be entered upon at any time during the Session, and attendance dated therefrom. Fee for the two years' practice required by the Curriculum, £12 12s. Fee for each course of Lectures, £3 3s.

The Dental Students' Society meets once a month in the Committee Room of the Hospital, when papers on subjects of interest are read and discussed by the Members.

DENTAL SCHOOL.

Dental Anatomy and Physiology, Human and Comparative, by J. COWAN WOODBURN, M.D.

The Lectures will be delivered in the Summer Session, on the mornings of Wednesday and Saturday at 8 a.m., and will be illustrated by Diagrams, Preparations, and Microscopic Specimens. Text-Book—Tomes, Manual of Dental Anatomy, Human and Comparative.

Dental Surgery and Pathology, by JAMES RANKIN BROWNLIE, L.D.S., Eng., M.R.C.S.

These Lectures are delivered on Tuesdays and Thursdays during the months of May and June, at 8 a.m., and will be illustrated by recent Specimens, and other Preparations and Drawings, &c. Text-books—Tomes, Manual of Dental Surgery; Salters' Dental Pathology and Surgery.

Mechanical Dentistry, by J. A. BIGGS, L.D.S.

This Course will commence on the first Tuesday of November at 7 p.m., and will consist of 12 Lectures, with Practical Demonstrations in Dental Laboratory.

Dental Metallurgy, by REES PRICE, L.D.S., Eng.

All communications on matters relating to the Dental School should be addressed to the Secretary, D. M. ALEXANDER, Solicitor, 117, Wellington Street, Glasgow, who will forward detailed Prospectus of the School.

BIRMINGHAM.

BIRMINGHAM SCHOOL OF DENTISTRY, QUEEN'S COLLEGE.

The teaching of Dentistry is now undertaken by the Queen's College acting in association with the Birmingham Dental Hospital, and the Birmingham Clinical Board, so that students may fully qualify themselves for the Dental Diplomas of the Royal Colleges.

The Dental Hospital is situated near the College, and is open daily (Sundays excepted). The number of patients treated there during the past year was upwards of 10,000.

The General and Queen's Hospitals offer every advantage for the study of General Surgery and Medicine, the arrangements for which are carried out under the direction of the Birmingham Clinical Board.

LECTURES FOR THE DENTAL CURRICULUM.

WINTER SESSION.

Special Subjects.

Dental Anatomy and Physiology.—J. HUMPHREYS, L.D.S.I., Dental Surgeon to the Dental Hospital. Thursday at 5 p.m.

Dental Surgery and Pathology.—C. SIMS, L.D.S., Eng., Senior Dental Surgeon to the Dental and Queen's Hospitals. Fridays at 5 p.m.

Dental Metallurgy.—W. A. TILDEN, D.Sc., F.R.S. *N.B.*—This class will be held at Mason's College. About ten lectures on this subject will be given on Tuesdays at 2.30 p.m., from October to Christmas.

General Subjects.

Anatomy, Practical Anatomy, Physiology, Chemistry, Medicine, Surgery. These Classes are similar to those in the Medical Department.

SUMMER SESSION.

Dental Tutor—FRANK H. GOFFE, L.D.S. (Eng. & Ed.)

Special Subjects.

Dental Mechanics.—W. ELLIOTT, L.D.S., Edin. & Dublin, F.C.S., Wednesdays, at 5 p.m.

General Subjects.

Materia Medica and Therapeutics.—*Practical Chemistry.*—These Classes are similar to those in the Medical Department.

FEES.

A Composition Fee of 60 guineas, payable in one sum or in two sums, viz., 40 guineas at the beginning of the first year and 20 guineas at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (inclusive of the necessary Hospital Practice).

N.B.—Further particulars may be obtained on application to the Warden at the College, or to the Hon. Secretary of the Dental Board, Queen's College, Mr. J. Humphreys).

BIRMINGHAM DENTAL HOSPITAL,

71, NEWHALL STREET.

OPEN DAILY AT NINE A.M.

Hon. Consulting Physician—ROBERT M. SIMON, M.D.*Hon. Consulting Surgeon*—JOHN ST. S. WILDERS, M.R.C.S.*Hon. Consulting Dentists :*

THOMAS R. ENGLISH. | ADAMS PARKER, L.D.S.

CHARLES SIMS, L.D.S.

Hon. Administrators of Anæsthetics :

S. HAYNES, M.B., Ch. M. | FELIX VINRACE, M.D., F.R.C.S.

CHARLES GREENE, M.R.C.S., | S. WINGFIELD, L.R.C.P., L.R.C.S.

L.R.C.P. | A. GRAY, M.R.C.S.

Hon. Dental Surgeons :

H. BREWARD NEALE, L.D.S. | J. HUMPHREYS, L.D.S.

F. E. HUXLEY, M.R.C.S., L.D.S. | F. W. RICHARDS, L.D.S.

Hon. Assistant Dental Surgeons :

F. H. GOFFE, L.D.S. | WM. PALETHORPE, L.D.S.

W. R. ROBERTS, L.D.S.

Demonstrator in Gold Filling, etc.

MR. W. PALETHORPE, L.D.S.

House Surgeon :

Mr. F. HOWARD, L.D.S.

DEMONSTRATIONS.

Clinical Demonstrations will be given from time to time by the staff on cases of particular interest ; also upon the preparing and filling of cavities and other operations upon the teeth and contiguous structures.

Dresserships in the extraction room for all Students.

Dental Students are required to register their names for Hospital Practice with the Honorary Surgical Secretary, Mr. F. W. Richards, 33, Paradise Street, from whom further information may be obtained.

DENTAL HOSPITAL OF IRELAND.

25, LINCOLN PLACE, DUBLIN.

The WINTER SESSION will commence Monday, October 7th, 1889.

The SUMMER SESSION will commence in May, 1890.

Consulting Physicians.

F. R. CRUISE, M.D. | JOHN W. MOORE, M.D.

Consulting Surgeons.

E. H. BENNETT, F.R.C.S.I. | Sir W. STOKES, F.R.C.S.I.

*Consulting Dental Surgeons.*R. H. MOORE, F.R.C.S.I. | DANIEL CORBETT, M.R.C.S.E.,
L.D.S., Eng.*Dental Surgeons.*

ROBERT HAZELTON, F.R.C.S.I. | DANIEL CORBETT, JUNR., A.B.,

W. BOOTH PEARSALL, F.R.C.S.I. | F.R.C.S.I.

R. THEODORE STACK, M.D., F.R.C.S. | GEORGE WYCLIFFE YEATES, M.B.,

D.M.D. (Harv.) L.D.S., Eng. [I. | Ch.M., L.D.S.I.

A. W. W. BAKER, M.D., F.R.C.S.I., | G. M. P. MURRAY, F.R.C.S.I.

L.D.S.I.

Anæsthetists:

CHRISTOPHER GUNN, M.D.

JOHN G. CRONYN, L.R.C.S.I.,
L.K.Q.C.P.I.

JOHN R. GRAVES, L.R.C.S.I., L.K.Q.C.P.I.

Pathologist—WILLIAM MALLET PURSER, M.D.*Registrar*—WILLIAM A. SHEA.

In connection with the Dental Hospital of Ireland, the Dental School will be open for the Winter Session on October 7th, 1889.

All Dental Students who have passed their Preliminary Examination are admissible to the Clinical Instruction of the Hospital, after paying Fees and subscribing to the conditions prescribed by the staff.

In addition to Clinical Instruction, Courses of Lectures will be given at the Hospital in Dental Surgery and Pathology, and in Mechanical Dentistry, by R. Theodore Stack, M.D.; A. W. W. Baker, M.D.; W. Booth Pearsall, F.R.C.S.I., and Daniel Corbett, F.R.C.S.I., and at the School of Physic which is within a few yards of the Hospital special lectures for Dental Students will be given in Dental Anatomy, and in Metallurgy by Professor Cunningham, and Professor Reynolds.

The Lectures on Dental Surgery and Mechanical Dentistry will be given during the winter, those in Dental Anatomy and Metallurgy during the summer months.

In addition to the longer courses, of Hospital attendance, special courses of three months duration, will be given to Surgeons about to join the Army and Navy, or to practise in the Colonies or remote country districts.

Among the advantages of the School is the Mechanical Laboratory, where every effort is made to assist the Student in Mechanical Dentistry. In addition to practical instruction in the details of Gold, Dental Alloy, Vulcanite, Celluloid, and continuous Gum Work, special demonstrations will be given in the Mechanical treatment of Cleft Palate; in the treatment of Dental Irregularities, and in the various methods of inserting Pivot Teeth.

Regulations as to Fees and other conditions are the same that exist at the Dental Hospital of London, Leicester Square. Any further information can be obtained from the Registrar of the Hospital, or

R. THEODORE STACK, Dean.

THE OWENS COLLEGE, MANCHESTER. DENTAL DEPARTMENT.

*Professors and Lecturers.**Anatomy*—PROFESSOR A. H. YOUNG, M.B., F.R.C.S.*Physiology*—PROFESSOR WM. STIRLING, M.D., D.Sc.*Medicine*—PROFESSOR J. E. MORGAN, M.D., M.A., F.R.C.P.

PROFESSOR JAMES ROSS, M.D., LL.D., F.R.C.S.

Surgery—PROFESSOR A. W. HARE, M.B., F.R.C.S.E.*Clinical Surgery*—F. A. HEATH, M.R.C.S.

WALTER WHITEHEAD, F.R.C.S.E.

THOMAS JONES, M.B., B.Sc., F.R.C.S.

JAMES HARDIE, M.D., F.R.C.S.

F. A. SOUTHAM, M.A., M.B., F.R.C.S.

G. A. WRIGHT, B.A., M.B., F.R.C.S.

Chemistry—PROFESSOR H. B. DIXON, M.A., F.R.S.*Materia Medica*—PROFESSOR D. J. LEECH, M.D., F.R.C.P.*Dental Surgery*—GEORGE G. CAMPION, L.D.S.*Dental Anatomy*—W. A. HOOTON, L.D.S.*Dental Mechanics*—THOS. TANNER, L.D.S.*Dental Metallurgy*—C. A. BURGHARDT, Ph. D.

The Fee for the 2 years' lectures, &c., required by the dental curriculum of the Colleges of Surgeons is £50 payable in two sums of £25 each at the beginning of the first and second years of studentship.

The 2 years' general Hospital practice is taken at the Royal Infirmary. The fee is £10 10 0, and includes that for attendance on the Lectures on Clinical Surgery.

For further particulars with regard to the Dental Department, application should be made to the Registrar, The Owens College, Manchester.

THE VICTORIA DENTAL HOSPITAL OF MANCHESTER, GROSVENOR STREET, ALL SAINTS.

Consulting Physicians.

SIR WM. ROBERTS, M.D., F.R.C.P.		J. E. MORGAN, M.D., F.R.C.P.
HENRY SIMPSON, M.D., M.R.C.S.		D. J. LEECH, M.D., F.R.C.P.
D. LLOYD ROBERTS, M.D., F.R.C.P.		

Consulting Surgeons.

E. LUND, F.R.C.S.		W. WHITEHEAD, F.R.C.S.
F. A. HEATH, M.R.C.S.		T. JONES, F.R.C.S.
J. HARDIE, F.R.C.S.		

Consulting Dental Surgeons.

H. CAMPION, M.R.C.S.		PARSONS SHAW, D.D.S.
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Dental Surgeons.

Monday Morning—H. PLANCK, L.D.S.I. ; J. RENSHAW, L.D.S.I.

Tuesday Morning—T. TANNER, L.D.S., Eng.

Wednesday Morning—J. H. MOLLOY, L.D.S.I. ; G. O. WHITTAKER, L.D.S., Eng.

Wednesday Evening—W. DYKES, L.D.S., Glasgow.

Thursday Morning—W. DOUGAN, L.D.S.I. : G. NASH SKIPP, L.D.S., Eng.

Friday Morning—G. G. CAMPION, L.D.S., Eng. ; W. SIMS, L.D.S.I.

Friday Evening—L. DRESCHFELD, L.D.S.I. ; W. HEADRIDGE, L.D.S.I.

Saturday Morning—J. W. DUNKERLEY, L.D.S.I. ; W. SMITHARD, L.D.S.I.

Administrator of Anæsthetics.

Wednesday Morning—J. PRINCE STALLARD, M.B.

Saturday Morning—ALEXANDER WILSON, M.R.C.S.

House Dental Surgeon.

C. H. SMALE, L.D.S., Eng.

The Hospital is situated conveniently for Students about 5 minutes' walk from The Owen's College. It contains three separate operating rooms devoted respectively to fillings, extractions, and operations under anæsthetics, and is open each morning in the week and on Monday, Wednesday and Friday evenings.

A prize value 3 guineas on operative dentistry is awarded annually, and the prizes at the Owen's College are also open to the students of the hospital attending the lectures.

The fee for the 2 years' hospital practice required by the Colleges of Surgeons is £12 12 0.

For further information apply to HENRY PLANCK, *Dean*.

LIVERPOOL

DENTAL HOSPITAL, MOUNT PLEASANT.

NORTHERN BRANCH—15, GREAT MERSEY STREET.

Consulting Physician—THOMAS ROBINSON GLYNN, M.D., M.R.C.P., Lond.

Consulting Surgeon—FRANK T. PAUL, F.R.C.S., Eng.

Consulting Dental Surgeons.

C. ALDER, L.D.S.	J. E. ROSE.
H. C. QUINBY, L.D.S., D.D.S.	W. H. WAITE, L.D.S., D.D.S.

Honorary Dental Surgeons.

R. M. CAPON, L.D.S., Glasg.	THOS. MANSELL, L.D.S., Edin.
E. A. COUNCELL, L.D.S., Eng.	J. N. P. NEWTON, L.D.S., Eng. D.D.S.
R. EDWARDS, M.R.C.S., L.D.S., Eng.	J. PIDGEON, L.D.S., Eng.
H. NEWTON HINDLEY, L.D.S., Eng.	M. QUINBY, D.D.S.
W. MAPPLEBECK, L.D.S.I.	J. ROYSTON, L.D.S., Eng.
W. MATTHEWS, L.D.S., Eng.	G. A. WILLIAMS, D.M.D.

Honorary Assistant Dental Surgeons.

M. ALEXANDER, L.D.S.I.	E. A. DAVIES, L.D.S.I.
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Honorary Demonstrator of Operative Dental Surgery.
Vacant.

Honorary Chloroformist—H. BRIGGS, M.B., F.R.C.S.

Stipendiary Dental Surgeons.

A. B. DALBY, L.D.S., Eng.	R. H. BATES, L.D.S., Eng.
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Northern Branch—CHARLES B. DOPSON, L.D.S.I.

Registrar—R. EDWARDS, M.R.C.S., L.D.S., Eng.

This Hospital is a school of Practical Dental Surgery, duly recognised by the Royal College of Surgeons, and open to all Students of Dentistry, under such regulations as shall be determined by the Committee of Management.

The Hospital is open, daily, for the admission of patients from 9 till 10 a.m. and from 6 to 7 p.m., except on Saturdays. Northern Branch open 9 to 10 a.m., and 6 to 7 p.m.

Fees for Hospital Practice, £5 5s. per annum, or a composition fee of £8 8s. for two years' Hospital Practice required for the curriculum to Students of the Medical Faculty, University College, Liverpool, and Pupils or apprentices of Registered Dentists.

Further information may be obtained by applying to the Honorary Secretary, W. L. JACKSON, Central Buildings, North John Street.

PLYMOUTH.

DENTAL HOSPITAL, OCTAGON.

Physician—C. ALBERT HINGSTON, M.D., Lond.

Surgeons.

CHRISTOPHER BULTEEL, F.R.C.S. | CONNELL WHIPPLE, M.R.C.S.

Consulting Dentist—F. A. JEWERS, M.D.S.

Dental Surgeons.

W. V. MOORE, L.D.S., Eng.	ERNEST E. JEWERS, L.D.S., Eng.
C. S. BATE, F.R.S., Eng.	ERNEST EDWARD JEWERS, L.D.S.E
F. H. BALKWILL, L.D.S., Eng.	HENRY WILLIAM MAYNE, L.D.S.I
LOUIS E. SEXTON, L.D.S., Eng.	

Treasurer—ALFRED PAYNE BALKWILL.

The Dentists attend each day, at 9 a.m. except Sundays.

DENTAL SCHOOL.

Certificates of attendance on the practice of this Dental Dispensary are recognised by the College of Surgeons as qualifying for the Diploma in Dental Surgery. The College also recognises the lectures delivered at the Dispensary.

Pupils of any of the Dental Surgeons of the Plymouth Dental Hospital, or other Dentists holding a Diploma of the College of Surgeons, or Member of the Odontological Society, may attend the Hospital on the day of such practitioner as may agree to accept such pupil or pupils, on the payment of £1 is. per annum to the Institution.

LECTURES.

On "Dental Physiology," by C. SPENCER BATE, F.R.S., L.D.S.

On "Dental Anatomy," by F. H. BALKWILL, L.D.S.

On "Dental Mechanics," by W. V. MOORE, L.D.S.

Fee to Lectures, one Course, £7 7s.

Fee to Lectures, double Course, £12 12s. (required for Diploma).

Fee to Dental Practice at Hospital, £5 5s. per annum.

Fee to entire Dental Curriculum (required for Diploma), 22 guineas.

Further information may be obtained from the Secretary, Mr. E. G. BENNETT, at above address.

* Corrections not having been received from this hospital its accuracy cannot be guaranteed.

EXETER.

DENTAL HOSPITAL.

Consulting Surgeons.

A. J. CUMMING, F.R.C.S., Eng.

JAMES BANKART, M.B., Lond., F.R.C.S., Eng.

Consulting Dental Surgeon.

S. BEVAN FOX, L.D.S., Eng.

Dental Surgeons.

J. T. BROWNE-MASON, L.D.S., Eng.

HENRY BIGING MASON, L.D.S., Eng.

S. MUNDELL, L.D.S., Eng.

T. G. T. GARLAND, L.D.S.I.

J. M. ACKLAND, M.R.C.S., L.D.S.,

Eng.

Surgeon Administrators of Anæsthetics.

JOHN MORTIMER, M.B., Lond.

MARTIN L. BROWN, M.D., Ed.

Honorary Secretary.

GEORGE A. TOWNSEND.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma.

The Hospital is open daily (Sundays excepted), and patients are admitted between the hours of 9 and 11 a.m.

Pupils of any member of the Staff or other registered Practitioner (being a Life or Annual Governor) are permitted to attend the practice of the Hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the Funds of the Institution. Students attending the practice of the Hospital must consider themselves strictly under the control of the Medical Officers, and must not undertake any operation without the consent of the Dental Surgeon for the day.

Numbers of cases treated in 1888, 4602.

DENTAL TUITION.

L.D.S. Examinations "*sine curriculo*," and otherwise, also all preliminary Examinations.

Messrs. Graham and Abbott, Dental Tutors, &c., prepare candidates for above Examination.

Synopsis of subjects taught:—Anatomy, General and Dental Surgery, General and Dental Physiology, Medicine, Chemistry, Dental Materia Medica and Therapeutics, Microscopy, and Metallurgy, Histology and Pathology general and dental. Heat, Magnetism, and Electricity.

Fees and all information, on application to Messrs. Graham & Abbott, 98, Queen St., Exeter.

PRIVATE SCHOOL OF ANATOMY, PHYSIOLOGY AND SURGERY.

And all professional subjects, including Chemistry, Physics, Materia Medica, Botany and Pharmacy; Medicine, Obstetrics, Diseases of Women and Children; Comparative Anatomy, Embryology, etc.

Demonstrations and Lectures by Mr. Thomas Cooke, F.R.C.S., senior Assistant Surgeon to the Westminster Hospital; and other Masters.

By decision of the Royal Colleges of Physicians and Surgeons, gentlemen rejected at their Anatomical and Physiological Examinations (Primary R.C.S. or Second Conjoint) can get "signed up" from this School for the three or six months' work they are now required to put in before re-examination.

The school meets the requirements of two classes of students, namely:—

I. Students preparing for the usual Primary and Pass Examinations of the several Licensing Bodies.

II. Qualified Practitioners and advanced Students, *i.e.*, gentlemen wishing either to obtain some of the Higher Qualifications, or to compete for Appointments in Her Majesty's Army, Navy, and Indian Medical Services. For these, special Classes are provided. (See separate Prospectus.)

The instruction is given on the dissected and undissected body, with normal and pathological specimens, microscopical preparations, chemical, physiological, and surgical apparatus, splints, &c. The operations of Surgery are performed on the dead body. Arrangements can be made for the attendance on midwifery cases, and for practical work in the dispensary.

The school possesses a good collection of physiological apparatus, allowing of the demonstration to the class of the great bulk of the Practical Exercises, in Physiology by Professors Burden-Sanderson, Foster and Langley, and other authors; also chemical apparatus, allowing every student, not only to see, but to repeat for himself, the analysis of the principal food-stuffs, and fluids and solids of the body, and also all the usual reactions, tests, &c. Gentlemen preparing for the Higher Examinations (M.B., Lond., Fellowship of the Royal College of Surgeons) receive special instruction in the more difficult subjects, and have the advantage of personally repeating (with certain restrictions as to the careful use of the physiological apparatus) the practical exercises in Physiology by Professors Burden-Sanderson, Foster and Langley, &c., above alluded to.

A Chemical Laboratory has been provided; and the necessary collections for the practical teaching of Chemistry, Materia Medica, and Pharmacy have been placed in the hands of an experienced teacher of these subjects.

IV.—GENERAL HOSPITALS.

CHARING CROSS HOSPITAL.

Dental Surgeon—J. FAIRBANK, M.R.C.S., who attends at the Hospital, three days a week, at 9 a.m., for Dental Operations. A course of Lectures on Dental Surgery is also given during January, February, and March.

The fee at this Hospital for the L.D.S. Course is £42 2s., which may be paid in two instalments; this includes the Library fee £2 2s., for which the student enjoys all the privileges of general students, which are as follows:

- 1st. They pay a proportionately lower amount of fees.
- 2nd. They alone are eligible for the following offices and appointments:—Resident Medical Officers, Resident Surgical Officers, Resident Accoucheur, Assistant Demonstrators, Pathological Assistant, Clinical Clerks, Dressers, Dentists' Assistants, etc.
- 3rd. They are admitted to the use of the library and reading-room and museum.

4th. They are admitted, without additional fee to the clinical and pathological demonstrations, and enjoy other advantages.

5th. They alone are entitled to compete for the scholarships.

Two prizes are awarded annually in the class of Lectures on Dental Surgery, of the value of six guineas and four guineas respectively.

Students may serve as assistants to the Dental Surgeon for a period of three months.

Arrangements have been made in the hours of lectures, to enable students to attend the practice at the Dental Hospital of London. Charing Cross Hospital is within three minutes' walk of the Dental Hospital of London.

The Medical School is being considerably enlarged, and in addition to other improvements Physiological and Pathological Laboratories will be erected, and an additional reading and writing room provided for the use of the Students.

For further information apply to the Dean, Dr. J. Mitchell Bruce, or to the Librarian Secretary, Mr. Francis Pink, at the office of the Medical School, Chandos Street, Charing Cross, between the hours of 10 and 4.

LONDON HOSPITAL MEDICAL COLLEGE.

Dental Surgeon—ASHLEY BARRETT, M.B., Lond., M.R.C.S., L.D.S.

The Council of the College of Surgeons recognise the Dental Department of the London Hospital as a school at which may be obtained the Dental Practice necessary to qualify a student for the Examination of the Dental Diploma. Dental Students may obtain the General Medical Education (that is, apart from certain special Lectures to be attended at a Dental School) and

the Dental Practice necessary for the Diploma, at the London Hospital School, on payment of Forty Guineas.

A course of Lectures on the Anatomy and Pathology of the Teeth and Dental Surgery will be delivered by Mr. Ashley Barrett, on days which will be duly announced. It comprises the treatment of Dental Irregularities, of Dental Caries, and such matters in connection with the subject as are of interest to the Medical Practitioner. Mr. Barrett gives practical instruction on Tuesdays at 9 a.m., which is open to all students of the School and Hospital, and can be attended by gentlemen who are not pupils on payment of a fee of Ten Guineas.

In addition to the Lectures a series of Demonstrations of the simpler modes of filling Teeth will be given during the month of June. The Demonstrations will refer to the mode of Manipulating Amalgam and Gutta Percha fillings, the preparation of Cavities, the filling of Teeth containing vital and dead pulps, the mode of relieving pain after filling, and the instruments needed for these operations.

A *Dental Assistant* is elected every three months, without any additional expense. The terms of the office date from the first Tuesday in January, April, July, and October. In selecting Candidates, priority will be given to those who have attended the greatest number of Lectures on Dental Pathology and Surgery, and have also been the most punctual in attendance in the Dental Department on Tuesday mornings.

Further information may be obtained on application to Mr. Munro Scott, the Warden, Medical College, London Hospital.

KING'S COLLEGE, STRAND, W.C.

Special arrangements are made for Dental Students. Apply to the Dean.

MIDDLESEX HOSPITAL

Consulting Dental Surgeons—SIR J. TOMES, F.R.S., F.R.C.S., L.D.S., and J. S. TURNER, M.R.C.S., L.D.S.

Dental Surgeon—W. STORER BENNETT, F.R.C.S., L.R.C.P., L.D.S.

Assistant Dental Surgeon—W. HERN, M.R.C.S., L.D.S.

In 1887 the acquisition of a site in Cleveland Street enabled a much needed extension of the Buildings to be carried out. The additions included an additional Lecture Theatre, a physiological Laboratory and Class Room, a Student's Room, and a Luncheon Room. A new and commodious Library and a Materia Medica Museum have also been opened.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite courses of Lectures which are arranged to fit in with the work at the Dental Hospitals—and Hospital Practice on payment of a fee of 40 guineas, in one payment, or by instalments of £30 on entrance, and £15 at the beginning of the Second Winter Session.

A short course of Lectures on Dental Surgery will be delivered during November and December by the Lecturer on Dental Surgery, Mr. Storer Bennett. The Lectures will be supplemented by practical Demonstrations,

which will be given every week during the Winter and Summer Sessions by the Dental Surgeon and Assistant Dental Surgeon. Students of the Hospital free, others pay a fee of 2 guineas.

Further information may be obtained from A. Pierce Gould, Esq., F.R.C.S., the Dean, or from the Resident Medical Officer at the Hospital.

ST. GEORGE'S HOSPITAL.

Dental Surgeon—A. WINTERBOTTOM, F.R.C.S., L.D.S.

Mr. Winterbottom attends at the hospital on Tuesdays and Saturdays at 9 a.m.; his assistant daily at 9 a.m. and at 1 p.m.

A course of Lectures on Dental Surgery is given by Mr. Winterbottom in the Summer Session. Free to Students of the hospital.

Fee for general subjects in Dental Surgery, including Practical Chemistry, £55. Payable in two instalments; first year, £30; second year, £25.

Further information can be obtained by application to Dr. WHIPHAM, Dean of the Medical School.

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.

Dental Surgeons—MR. EWBANK, MR. MACKRELL.

Assistant Dental Surgeons—MR. ACKERY, MR. READ.

The Dental Department of the Hospital is open on Tuesday and Friday mornings at 9 o'clock. The practice of the department is recognised by the Royal College of Surgeons.

The fee for general subjects for Dental Students for the first winter is £33 2s. 6d., for the first summer £33 2s. 6d., or a single payment of £66 3s.

This hospital is the oldest and one of the largest in London, and among many advantages which it offers to the student is that provision is made for their residence in the College, on the recommendation of a medical officer of the Hospital. For the terms of board and residence, and all other information regarding the College, applications should be made, either personally or by letter, to the Warden of the College, Dr. Moore.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.

Dental Surgeon—H. HOWARD HAYWARD, M.R.C.S., L.D.S.

Practical instruction in Dental operations is given on Wednesdays and Saturdays, at 9.30 a.m. Dressers are appointed, who hold office for three months. Also a special course of Lectures on Dental Surgery.

Fee for the course, £2 12s. 6d.

For prospectus and further information apply to the School Secretary.

HERBERT W. PAGE, Dean of the School.

ST. THOMAS'S HOSPITAL.

Dental Surgeon—CHARLES EDWIN TRUMAN, M.R.C.S., L.D.S.

Assistant Dental Surgeon—

Gentlemen may receive instruction in diseases of the teeth, are appointed dressers, and can undertake operations, subject to the supervision of the Dental Surgeons, Tuesdays and Fridays at 10 a.m.

Numerous cases of irregularity of the teeth, and the application of artificial appliances, are undertaken during the term.

The fee for attendance on the *general* subjects required of the students in Dental Surgery, is, for the two years, £55 or by instalments, £50 for the first year, and £10 for the second year.

Dental practice, one year, two guineas; perpetual, three guineas.

For further information apply to G. RENDLE, Esq. M.R.C.S., Medical Secretary.

WESTMINSTER HOSPITAL.

Dental Surgeons—J. WALKER, M.D., M.R.C.S., L.D.S., and A. MORTON SMALE, M.R.C.S., L.D.S.

Dr. Walker attends at 9 15 a.m. on Wednesdays. and Mr. Morton Smale on Saturdays at 9 15 a.m., for practical demonstration of diseases and operations on the teeth.

The fee for attendance on the Dental Practice is £2 2s. for three months, and £3 3s. for six months. The whole of the General Lectures and Surgical Practice required for the Dental Diploma of the College of Surgeons can be attended for £52 10s. in one sum on entrance, or for two sums of £33, and £22, payable at the beginning of each year.

Dr. Walker will deliver a course of Lectures on Dental Surgery and Pathology on Wednesdays, in October, November, and December, at 9.30 a.m.

A Scholarship value £20 is offered, annually in September for Competition to commencing Dental Students.

SCHOOL OF MEDICINE, SURGEON'S HALL, EDINBURGH.

The fees required for students attending general subjects necessary for the curriculum of the Royal College of Surgeons, Edinburgh, are £38 10s.

HARVARD UNIVERSITY, DENTAL DEPARTMENT, BOSTON MASS, U.S.A.

The Sessions of this School begin the last Thursday in September, and end the last Wednesday in June, making nine months of practically continuous work in each year.

General Anatomy, with Dissections, Physiology, and General Chemistry, are the studies of the first year. Of the second year they are Operative and Mechanical Dentistry, Dental Materia Medica and Therapeutics, Oral Surgery, and Surgical Pathology. The Student can also attend gratuitously all the *lectures* in any other department of the University.

The infirmary furnishes abundant facilities, averaging 8,000 operations, of which a large proportion consists of filling teeth, every year.

The University degree D.M.D. (Dentairæ Medicinæ Doctor) is conferred on all who fulfil the requirements.

The diploma is recognised by the English Medical Council.

For the first year a student is a member of the school, the fee is 200 dols; for the second year, 150 dols; and for any subsequent year, 50 dols.

For further information and catalogues, address, Thomas H. Chandler, Dean, 161, Newbury Street, Boston, Mass., U.S.A.

THE DENTAL COLLEGE OF THE UNIVERSITY OF MICHIGAN.

The Fifteenth Annual Session of this Institution will commence on the 1st of October, and close on the last Wednesday of June, thus making a course of nine months. A preliminary examination, having reference to general educational attainments, is required.

The Student in this department will receive instructions in Anatomy, Physiology, Pathology, Chemistry, Materia Medica, Therapeutics and Surgery, from the professors of their respective branches in the *Departments of Medicine and Surgery* of the University, when lectures commence and continue the same as with the Dental College.

FACULTY OF THE DENTAL DEPARTMENT.

President.

J. B. ANGELL, L.L.D.

Principles and Practice of Operative Dentistry.

J. TAFT, M.D., D.D.S.

Anatomy and Physiology.

CORYDON L. FORD, M.D., D.D.S.

Lecturer on Oral Pathology and Dentistry.

J. N. MARTIN, Ph. M., M.D.

Clinical Dentistry.

J. A. WATLING, D.D.S.

Mechanical and Prosthetic Dentistry.

W. H. DORRANCE, D.D.S.

Demonstrator of Clinical Dentistry.

L. P. HALL, D.D.S.

Assistant Professor of Practical Dentistry.

N. S. NOFF, D.D.S.

Special instructions will be given in Dental Pathology, Oral Surgery, Dental Therapeutics, and diseases of Women and Children, with reference to the teeth.

Students should be promptly present at the College on Thursday, September 30th, to make the preliminary arrangements for entering upon regular work.

CONDITIONS OF GRADUATION.

The Candidate must be twenty-one years of age. He must furnish evidence of good moral character.

He must devote three years to the study of his profession. He must attend three full courses of Lectures in the Dental College, or two courses in some College having an equal standard of requirements, and the last one here.

He must sustain an examination satisfactory to the Faculty in all the branches taught.

FEEES AND EXPENSES.

The fees, which must be paid in advance, are as follows:—

RESIDENTS OF MICHIGAN.—Matriculation, 10.00 dols.; Annual dues, 25.00 dols.

NON-RESIDENTS. Matriculation, 25.00 dols. Annual dues, 35.00 dols.

GRADUATION FEE.—For all alike, 10.00 dols. The admission fee is paid but once, and entitles the student to the privilege of permanent membership in any department of the University. The Annual due is paid the first year and every year thereafter while at the University.

For further particulars, address the Dean of the Dental College, Ann Arbor, Mich.—J. TAFT, Dean.

IV.—SCIENTIFIC ASSOCIATIONS.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN,
40, LEICESTER SQUARE.

OFFICERS FOR 1889,

President—HENRY SEWILL.*Vice-Presidents.*

RESIDENT.

J. H. MUMMERY.
W. F. FORSYTH.
FELIX WEISS.

NON-RESIDENT

G. C. MCADAM (Hereford).
J. C. WHEELER (Southsea).
W. B. MACLEOD (Edinburgh).*Treasurer*—THOMAS ARNOLD ROGERS.*Librarian*—ASHLEY GIBBINGS.*Curator*—STORER BENNETT.*Editor of the Transactions*—WALTER COFFIN.*Honorary Secretaries.*C. J. BOYD WALLIS (Council), | E. G. BEITS (Society).
J. ACKERY (For Foreign Correspondence).*Counsellors.*

RESIDENT.

JOHN FAIRBANK
DAVID HEPBURN.
ASHLEY W. BARRETT.
R. H. WOODHOUSE.
L. MATHESON.
W. SCOTT THOMPSON.
C. S. TOMES, F.R.S.
WILLOUGHBY WEISS.
W. H. WOODRUFF.

NON-RESIDENT.

E. APPERLEY (Stroud).
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R. W. WHITE (Norwich).
T. C. PARSON (Clifton).
R. T. STACK (Dublin).
F. J. VANDERPANT (Kingston-on Thames).
M. de C. DICKINSON (St. Leonards-on-Sea).
A. A. de LESSERT (Aberdeen).
ALEX FOTHERGILL (Darlington).

EXTRACTS FROM THE BYE-LAWS.

Objects and Constitution of the Society.

The society is instituted for the encouragement and diffusion of knowledge in Dental Surgery, and for the promotion of intercourse among members of the Dental Profession.

The Society shall consist of resident, non-resident, corresponding, and honorary members.*

1. The resident members shall consist of gentlemen practising as Dental Surgeons in London or within ten miles of the General Post Office, St. Martin's-le-Grand.
2. The non-resident members shall consist of gentlemen practising as Dental Surgeons, residing beyond ten miles from London.
3. The corresponding members shall consist of distinguished gentlemen practising as Dental Surgeons residing in the Colonies of Great Britain or foreign countries.

* The following bye-laws has come into force: "That on and after November 1st, 1882, candidates for the Resident, Non-Resident, or Corresponding Membership of the Society, shall not be eligible unless they practise as Dental Surgeons, or are interested in the progress of Dental Surgery, and are also Licentiates in Dental Surgery, or qualified Practitioners of Medicine or Surgery; or possess such a Diploma or Degree as in the opinion of the Council, will qualify them for the Membership of the Society."

4. The honorary members shall consist of distinguished practitioners of Dental Surgery who have retired from practice, of distinguished medical Practitioners, and of gentlemen distinguished in any department of science.

Persons who advertise in the public journals, or by circular, either their profession or their professional attainments or public appointments, or anything relating to their mode of practice or charges, or who expose for public inspection specimens of operative or mechanical Dentistry, or conduct their practice in any way which in the opinion of the Council of this Society, is derogatory to the respectability of the profession, shall not be considered eligible for nomination as members.

No person being the proprietor of a secret remedy, or holding a patent relating to the requirements of Dental Practice, shall be a member of this Society.

Election and Admission of Resident and Non-Resident Members.

Recommendations for resident members shall be signed by two members from personal knowledge, and by two or more from general knowledge. Recommendations for non-resident members may be signed by one member only from personal knowledge, and by two or more from general knowledge.

All recommendations for resident or non-resident members shall be submitted to, and approved of, by the Council, before being proposed to the Society for ballot.

Contributions of Members.

Every person elected a resident member shall pay three guineas as an admission fee, and an annual subscription of two guineas, *in advance*.

Every person elected a non-resident member shall pay two guineas as an admission fee and an annual subscription of one guinea in advance.

The entrance fees and first annual subscriptions shall be paid on admission, and the subsequent annual subscriptions in the month of November in each year; but new members proposed at or after the annual meeting, shall not be required to pay any subscription for the current session.

Ordinary Meetings.

The Ordinary meetings of the Society shall be held on the first Monday in each month, from November to June, both inclusive, at 8 p.m. precisely, except in the month of January.

Each member may introduce two visitors at these meetings on writing the visitors' names in a book to be kept for that purpose. The same visitors will not be admitted more than three times during one season.

Annual General Meeting.

The annual general meeting of the Society for the election of the officers and councillors, &c., shall be held on the evening of the second Monday in January every year.

Society's Transactions.

The transactions of the Society, under the designation of "Transactions of the Odontological Society of Great Britain," shall be printed at such times and in such manner as the Council shall direct.

The "Transactions" shall be presented to all resident and non-resident members of the Society who have paid their annual subscriptions.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

5, LAURISTON LANE, EDINBURGH.

President—J. AUSTEN BIGGS, L.D.S.*Vice-Presidents.*

J. MOORE LIPSCOMB, L.D.S., Eng. | G. W. WATSON, L.D.S.

Treasurer—JAMES MACKINTOSH, ESQ.*Secretary*—JOHN S. AMOORE, L.D.S., Eng., 7, Abercromby Place.*Curator and Librarian*—J. STEWART DURWARD, L.D.S., Edin.WALTER CAMPBELL, L.D.S., Eng. | W. H. WILLIAMSON, M.D., L.D.S.,
D.D.S.

REES PRICE, L.D.S., Eng. | J. GRAHAM MUNRO, L.D.S.

Ordinary Meetings.—The Society meets on the second Thursdays of November, December, January, February and March.

EXTRACTS FROM THE CONSTITUTION AND LAWS.

Name and Objects.

The Society shall be named the "Odonto-Chirurgical Society," and shall have for its objects the Promotion and Diffusion of Knowledge in matters connected with Dental Surgery; the furtherance of communications on such subjects by Members of the Society; and otherwise to advance the interests of Dental Surgery as a branch of Medicine.

Ordinary and Honorary Members.

The Society shall consist of Ordinary, Honorary, and Corresponding Members:

The Ordinary Members shall consist of Gentlemen practising as Dentists in Great Britain, and of Medical and Surgical Practitioners interested in Dental Surgery.

The Honorary and Corresponding Members shall consist of Gentlemen practising Dentistry in Great Britain, in the Colonies, or in Foreign Countries, and of retired Dental Practitioners in Britain, as well as such Medical or generally Scientific men as may have distinguished themselves in connection with Dental Surgery.

The Ordinary Members shall have vested in them the Government of the Society, and all cases not otherwise specified shall be decided by them by a majority of votes by ballot if required.

Obligations of Members.

No Member shall be permitted to advertise his profession, his modes of practice, or his charges, either in the public journals or by circular. They shall not be permitted to expose specimens of their work for public inspection, nor to carry on their practice in connection with any other business, nor to hold any patent relating to Dental practice, nor to conduct themselves in any way which the Society may consider derogatory to the Profession, so long as they continue Members of the Society. But Members who practise in towns other than that in which they reside shall be allowed to intimate their visits; such intimations being subject to the approval of the Council.

Applications for Membership.

Candidates for admission as Members of the Society shall be recommended by an Ordinary Member, and the recommendation seconded by another. After being approved by the Council, such recommendation shall be read to the Society at an Ordinary Meeting, and shall lie over to the next, when the Candidate shall be balloted for, when two-thirds of the Members present must be in his favour to secure his election.

Contributions.

Ordinary Members residing within a ten-mile radius of the City shall pay an Entrance Fee of One Guinea, and One Guinea of an Annual Subscription in advance. All other Ordinary Members shall pay an Entrance Fee of One Guinea, and Ten Shillings and Sixpence of an Annual Subscription. All Annual Subscriptions to date from the 1st March preceding the Candidate's admission.

THE BRITISH DENTAL ASSOCIATION.

(Incorporated June 3rd, 1880.)

40, LEICESTER SQUARE, LONDON.

President—S. LEE RYMER, L.D.S., Eng.

President-Elect—J. T. BROWNE-MASON, L.D.S., Eng.

Vice-Presidents.

SIR EDWIN SAUNDERS, F.R.C.S.	SIR JOHN TOMES, F.R.S., F.R.C.S.,
DR. JOHN SMITH, F.R.C.S., Edin.	L.D.S., Eng.

Treasurer—FREDK. CANTON, M.R.C.S., L.R.C.P., L.S.A.
L.D.S., Eng.

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Vice-President—FELIX WEISS, L.D.S., Eng.

For London.

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M.R.C.S., L.S.A., L.D.S., Eng.	W. H. WOODRUFF, L.D.S., Eng.
J. ACKERY, M.R.C.S., L.D.S., Eng.	

For the Provinces.

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L.D.S.I., Clifton.	Dub., F.R.C.S.I., D.M.D.
J. L. F. PIKE, L.D.S., Eng., Sheffield.	E. APPERLY, L.D.S., Eng., Stroud.
W. A. HUNT, L.R.C.P., Lon.,	J. R. BROWNLIE, L.D.S., Eng., Glas-
M.R.C.S., Yeovil.	gow.
W. S. WOODBURN, L.D.S., Glas.,	J. CORNELIUS WHEELER, Southsea.
Glasgow.	G. CUNNINGHAM, B.A., Cantab.,
J. A. BIGGS, L.D.S., Glas., Glasgow.	D.M.D., L.D.S., Eng., Cam-
W. CAMPBELL, L.D.S., Eng., Dundee.	bridge.
J. FOTHERGILL, M.R.C.S., L.D.S.,	E. L. DUDLEY, L.D.S., Eng., Bath.
Eng., D.D.S., Penn., Darlington.	W. E. HARDING, L.D.S., Eng.,
W. H. B. NEALE, L.D.S.I., Birming-	Shrewsbury.
ham.	T. E. KING, L.D.S., Eng., York.
J. H. REDMAN, L.D.S.I., D.D.S.,	R. P. LENNOX, Cambridge.
Phil., Brighton.	C. SIMS, L.D.S., Eng., Birmingham.

Ex-Officio Members.

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ANDREW WILSON, L.D.S., Edin., <i>President.</i>	}	Scottish Branch.
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ROBERT H. MOORE, F.R.C.S.I., <i>President.</i>	}	Irish Branch.
W. B. PEARSALL, F.R.C.S.I., <i>Hon. Sec.</i>		

MORTON SMALE, M.R.C.S., L.S.A., L.D.S., Eng, *Hon. Secretary.*

Extracts from Memorandum of Association and Bye-Laws.

The objects for which the Association is established are the promotion of Dental and the allied Sciences, and the maintenance of the honour and the interests of the Dental profession by

“The Periodical meetings of the Members of the Association and of the Dental profession generally, in different parts of the country.

“The publication of a periodical journal, and by

“The maintenance of the spirit and provisions of the Dentists’ Act, by such lawful means as may be necessary, &c., &c.”

Extract from the Bye-Laws.

A person who is registered in the Dentists’ Register shall be eligible for election as a member of the Association, provided that he be of good character; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements or circulars, describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

Any registered practitioner not disqualified by any Bye-law, who shall be recommended as eligible by any three Members of the Association (the recommendation of one being from personal knowledge), and who has signed the appended form of application for admission and agreement as to terms of Membership, may be elected a Member by the Representative Board or by a committee appointed for that purpose by the Board, or by the Council of a recognised Branch.

The subscription is One guinea per annum, and each member is entitled to a copy of the Journal of the Association monthly, and to attend the Annual Meetings of the Association.

Forms of application for membership may be had of the Hon. Sec., 40 Leicester Square, London, W.C.

BENEVOLENT FUND OF THE BRITISH DENTAL ASSOCIATION.

Chairman—SIR JOHN TOMES, F.R.S. (Pres. of the Representative Board.)

Trustees:

SIR EDWIN SAUNDERS, London.

RICHARD ROGERS, Esq., Cheltenham.

JAMES PARKINSON, Esq., London.

Hon. Treasurer—A. J. WOODHOUSE, Esq.

Committee of Management.

ASHLEY GIBBINGS, Esq. London HOWARD MUMMERY, Esq, London.

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BRITISH DENTAL ASSOCIATION, WESTERN BRANCH.

OFFICERS, 1889-90.

President—J. C. OLIVER, L.D.S., Eng.

President-elect—J. T. BROWNE-MASON, L.D.S., Eng.

Vice-Presidents.

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GEO. C. MCADAM, L.D.S., Eng.	E. APPERLEY, L.D.S., Eng.
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Council.

J. M. ACKLAND, M.R.C.S., L.D.S., Eng.	W. HELYAR, L.D.S.I.
W. F. CORNELIUS, L.D.S., Eng.	A. KENDRICK, L.D.S., Eng.
E. L. DUDLEY, L.D.S., Eng.	H. MALLET.
H. P. FERNALD, L.D.S.I.	T. COOKE PARSON, M.R.C.S., Eng.
T. TAYLOR GENGE, L.D.S.I.	G. B. PEARMAN, L.D.S., Eng.
C. A. HAYMAN, L.D.S., Eng.	R. ROGERS, L.D.S.I.
	A. SMITH, L.D.S.I.
	W. CALEB WILLIAMS, L.D.S., Eng.

Hon. Sec.—HENRY B. MASON, L.D.S.

A person who is registered in the Dentists' Register shall be eligible for election as a Member of this Branch, provided he be of good character; that he does not conduct his practice by means of the exhibition of Dental specimens, appliances, or apparatus in an open shop, or in a window, or in a show-case exposed to public inspection; or by means of public advertisements; or circulars describing modes of practice, or patented or secret processes; or by the publication of his scale of professional charges.

Any dental practitioner who can subscribe to the conditions laid down in Bye-law 4, who has been recommended as eligible by any three members of this Branch, may be elected a Member by the Council, and shall be admitted a Member of the British Dental Association.

THE MIDLAND BRANCH OF THE BRITISH DENTAL ASSOCIATION.

President—H. C. QUINBY, L.D.S., Liverpool.

President-elect—G. BRUNTON, ESQ., Leeds.

Treasurer—S. WORMALD, L.D.S., Stockport.

Hon. Sec.—W. H. WAITE, L.D.S., Liverpool.

Council.

H. CAMPION, M.R.C.S., Manchester.	G. BRUNTON, Leeds.
E. H. WILLIAMS, L.D.S., Manchester.	G. G. CAMPION, L.D.S., Manchester.
W. GLAISBY, L.D.S., York.	J. A. FOTHERGILL, M.R.C.S., L.D.S., Darlington.
T. MURPHY, L.D.S., Bolton.	J. L. PIKE, L.D.S., Sheffield.
J. RENSHAW, L.D.S., Rochdale.	W. E. HARDY, L.D.S., Shrewsbury.
T. E. KING, L.D.S., York.	J. C. STOREY, L.D.S., Hull.
H. BLANDY, L.D.S., Nottingham.	

Composed of Members of the British Dental Association who reside in the Midland and North-Western Counties of England, and of Associates who can fulfil the conditions laid down in the Bye-laws. The Annual Meeting takes place in April.

EXTRACT FROM BYE-LAWS.

2. The Association shall consist of Members and Associates. No one shall be eligible for membership who is not already a member of the British Dental Association. Any registered Practitioner of good character, who does not conduct his practice by means of the exhibition of Dental specimens, appliance or apparatus in an open shop, or in a window, or in a show case exposed to public inspection: or by means of public advertisements or circulars describing modes of practice; or patented or secret processes; or by the publication of his professional charges, may be admitted as an Associate. Associates shall be entitled to all the privileges of the Branch Association, but shall not be entitled to vote or hold office therein.

3. Any member of the British Dental Association may be elected a Member of the Branch by the Council of the Branch, at any of their Ordinary Meetings, on his sending a written application for election to the Secretary of the Branch.

4. Any registered Practitioner who can subscribe to the conditions laid down in Bye-law 2, and who shall be recommended as eligible by any three Members or Associates, may be elected an Associate by the Council, on his forwarding the recommendation and his subscription to the Honorary Secretary of the Branch.

BRITISH DENTAL ASSOCIATION.
EASTERN COUNTIES BRANCH.

OFFICERS, 1889-90.

President—AMOS KIRBY, L.D.S., Eng.

President Elect—W. STRINGFIELD, L.D.S.I.

Hon. Treasurer—H. F. WHITE, L.D.S., Eng.

Council.

J. FENN COLE, L.D.S., Eng.

B. W. HARCOURT.

F. Hall, L.D.S.I.

R. P. LENNOX

H. W. TRACEY, L.D.S., Edin.

S. CUNNINGHAM, M.A., Cantab,
L.D.S., Eng, D.M.D.

ALEX. KIRBY, L.D.S., Eng.

R. PAYLING

R.W. WHITE, M.R.C.S., L.D.S., Eng.

Hon. Secretary—W. A. RHODES, L.D.S.I.

Districts.

Norfolk, Suffolk, Cambridgeshire, Essex, Lincolnshire, Northamptonshire, Huntingdonshire, Bedfordshire, Hertfordshire, and Bucks.

Bye Law.

Any Registered Dental Practitioner, who shall be recommended as eligible by any three members of the Branch, (one being from personal knowledge), may be elected a member by the Council. The election to be by ballot: three black balls to exclude.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL
OF LONDON, LEICESTER SQUARE, W.C.

President—MR. W. HERN, M.R.C.S., L.D.S.

Vice-Presidents:

MR. C. F. RILOT, L.R.C.P., M.R.C.S., L.D.S.

MR. J. F. COLYER, L.R.C.P., M.R.C.S., L.D.S.

Treasurer—MR. F. C. PORTER, L.D.S.

Secretaries—MR. W. H. DOLAMORE, L.D.S., MR. F. A. HARSANT, L.D.S.

Curator and Librarian—MR. E. PREEDY.

*Councillors :**Second Year's Students.*

MR. A. BLACK.
MR. F. BURTON.
MR. E. PARSONS,
MR. G. SPRAY.
MR. J. P. OLIVER.

First Year's Students.

HR. W. R. BARRETT.
MR. H. L. BRIAULT.
MR. G. HERN.
MR. H. FORSYTH.

The object of the Society is the consideration of matters specially appertaining to Dentistry. The affairs of the Society are managed by a Council consisting of a President, two Vice-Presidents, Treasurer, two Secretaries, Curator, and nine other members. The President is chosen from the past Students who have obtained their degree of L.D.S.; the Vice-Presidents from past Students with or without qualification.

Any gentleman wishing to become a member, must be proposed and seconded at one meeting, and be balloted for the next; one black ball in four to exclude. The entrance fee for ordinary members is half-a-crown, and there is an annual subscription of the same amount.

Ordinary meetings are held at 7 p.m. on the second Monday in every month, from October to March inclusive. The annual meeting for the election of officers and other business is held in January of each year.

Every member has the power of introducing one visitor, not being a Student of the Hospital or School, to the meetings, with the consent of the President. Visitors are invited to take part in the discussion of the papers and clinical cases.

There is a Library and a Museum in connection with the Society, both being under the superintendence of the Curator.

The Council offer a prize, value £3 3s., at the end of each year, for the best paper read before the Society during that year.

STUDENTS' SOCIETY OF THE NATIONAL DENTAL HOSPITAL AND COLLEGE.

President—P. SIDNEY SPOKES, Esq., M.R.C.S., L.D.S., Edin.

Vice-Presidents.

MORGAN HUGHES, Esq., M.R.C.S., L.D.S., Eng.

F. HENRY WEISS, Esq., L.D.S., Eng.

Hon. Treasurer and Secretary to Council—FRED. T. HAYCROFT.

Hon. Secretary to the Society—ARNOLD PRAGER.

Council—Messrs. P. GREETHAM, L.D.S., Eng., H. J. KLUGHT, L.D.S., Glas., C. A. CLARKE, L.D.S.I., C. L. ALLNUTT, R. S. FARO, L.D.S., Eng., W. RUSHTON, L.D.S., Eng.

Hon Librarian and Curator—W. R. ELPHINSTONE, L.D.S., Eng.

This Society, which was established March 15, 1878, was constituted for the encouragement and diffusion of knowledge in Dental Science, and for the promotion of intercourse among its Members; and all Students of Dental Science are eligible for Membership. All Candidates for Membership must be approved by the council before being proposed to the Society for election. The Entrance Fee is 2s. 6d., and the Annual Subscription, 2s. 6d., to be paid in advance. The Ordinary Meetings of the Society are held on the first Friday in each month, from October to June, both inclusive, at 8 p.m. precisely. Each Member may introduce two visitors, not being Students of the Hospital or College, but the same visitors may not be admitted more than three times during one Session.

British Journal of Dental Science.

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AN ADDITIONAL NOTE ON NITROUS OXIDE ADMINISTRATION.

By DUDLEY WILMOT BUXTON, M.D., B.S., M.R.C.P.
Administrator of Anæsthetics in University College Hospital,
The Hospital for Women, Soho Square, and the London
Dental Hospital.

It is always valuable to hear the other side of a question, and I, therefore read with anticipation of pleasure, Mr. Ottley Atkinson's paper entitled "Notes on Nitrous Oxide." As however some of his teaching is not quite in harmony with what I hold to be right, I venture to adduce a few arguments in favour of views which I in common with most of the London Anæsthetists both hold and teach.

In the first place, it is urged by him that there are advantages associated with the practice of one man administering nitrous oxide and performing the dental operation. As this assertion is supported by the statement that, since the operator alone can possess the knowledge of how much he has to do in the way of removing teeth, he can more readily judge what degree of anæsthesia is requisite. I have never before met with anybody who has taken up this position. There are many country dentists who never have the opportunity of calling to their aid a skilled administrator, and when no partner exists, it is of course obligatory upon them to administer nitrous oxide by themselves, or let it alone. There are others who can only obtain the assistance of medical men unpossessed of the requisite skill for the administration of nitrous oxide, and again it is best under these circumstances for the expert dentist to rely upon himself rather than on the inexperienced doctor, but with these reservations I think the dentist is wise who refuses to administer gas and operate at one and the same time, and I will go a step further, and add that under no circumstances will a prudent man, should he be

forced to administer gas and operate, do so except in the presence of a third person. My reason for saying this will appear later on. Now with regard to the extent to which the administrator may be able to push the anæsthesia, I would observe that nitrous oxide narcosis is not a question of degree, at least in so far as may be controlled by the administrator. That the length of time that the patient remains unconscious does vary in individuals, I am prepared to admit—in fact it is the daily experience of every one of us, but we cannot by any amount of skill ensure that in any particular case a prolonged anæsthesia will be obtained.

Occasionally one hears it said, ‘Oh, it is only one easy tooth, you need not push the gas.’ But the practice of allowing the operator to commence an extraction in the early stage of nitrous oxide narcosis, before the blood is duly saturated with that agent, is to court disappointment and failure. It is a wise maxim to remember that no tooth should be regarded as capable of easy extraction until it is out of the mouth. So-called “loose teeth” only too often prove most difficult of extraction from exostosis or other cause, and wise extractors refrain alike from prophecy and promise in dealing with their patients.

Again, the skilled administrator of anæsthetics,—and none can be so considered unless he has had considerable experience in giving anæsthetics for dental operations, is usually quite as well able to decide how much time will be wanted for any given operation, and things being equal, if his attention is not occupied by thinking of the details of the operation will be more likely to obtain a satisfactory result, than the dentist giving his own gas and planning his operation. The great principle of division of labour would be proved a fallacy were it capable of being shewn that one man could undertake two distinct offices better than two men, each of them being possessed of the maximum skill in his own department.

But where the advantage of the skilled anæsthetist comes in (whether he be another dentist, or a specialist, is of course immaterial) is the power which such an one possesses of controlling the movements of the patient’s head, and the assistance he can offer should one of those complications occur, which so frequently do, more especially when one is not prepared for them. It is in this connection I would urge the importance of never being alone with your patient, when he or she is to be narcotized.

Let us consider some few of the many inconveniences, if we do not call them by a less trivial name, likely to supervene between the commencement of the inhalation and the extraction of the last tooth. I think I may safely say that we nowadays regard the dangers of nitrous oxide as being those rather of mechanical imperfections of the method employed than of the gas itself. When pure gas is inhaled, the exhalations of the lungs carefully eliminated by the expiration valve and all asphyxial complications avoided, we no longer fear syncope or dread other sinister results of inhalation of the gas. On the other hand, we have to remember that the patient when duly narcotized cannot help himself or control accidents from culminating in a dangerous manner. We know that deaths have occurred subsequent to the exhibition of nitrous oxide, and that these have arisen from dislocation or breakage of the gag or mouth prop used to keep the teeth apart, from the impaction of an extracted stump or root in the glottis, or even as the result of breakage of an elevator or forceps—the fragments having found their way into the respiratory tract. We farther know that one, if not more deaths have followed the shock occasioned by a patient's resuming consciousness in the middle of the operation. And that some of these cases at least have occurred when the operator had given gas, and that his attention being entirely engrossed in the details of the operation he was conducting, he failed to notice the dangerous plight in which his patient was, until alas, too late. When the administrator is an expert, he would never cease to watch his patient, until the operation were completed. Should a gag slip, it will be his business, his hands being both free, to rapidly and dexterously remove the foreign body from the mouth, taking care not to hamper the dentist while so doing. He will be prepared, if occasion requires, to open the mouth, and to have due regard, lest any fragments of teeth fall into the mouth, and rapidly remove these also, lest falling back, they enter the larynx.

Now under any of these circumstances, the operator, however alert he may be, could not without loss of time by dropping the instruments, and again taking them up assist himself so well, or so rapidly as he can be assisted by another pair of hands. Again the independent administrator will by his constant watching of the patients countenance and colour be able to judge to a nicety whether the patient is returning to consciousness or whether the operation may be continued; if

anything is going wrong; or if any ugly symptoms are beginning to assert themselves, basing his judgment on the thousand and one signs which experience alone teaches, and which would in all probability have escaped the notice of the operator since his attention ought to be concentrated in what he is doing, viz., extracting teeth.

If due accord exist between operator and anæsthetist, at the latter's suggestion all operative procedure would cease, and what is a very true and grave danger—heart failure due to the patient's resuming consciousness before the completion of the operation and feeling pain, be avoided.

Upon the subject of hallucinations, occurring under nitrous oxide administration, I cannot deem as at all convincing the negative evidence offered by Mr. Atkinson when he says "the experienced anæsthetist has nothing to fear from erotic or other untoward manifestations. The writer has not witnessed one such case during the last fifteen years." Mr. Atkinson goes on to say that should such symptoms arise, they are probably due to imperfection in the gas, or its administration. In opposition to this purely negative argument, I would venture to assert that erotic manifestations are by no means rare, even when gas is administered by a specialist under conditions which preclude the supposition that the gas is bad, or the administrator careless. Veteran anæsthetists like the late Mr. Clover, Mr. George Bailey, and Mr. Woodhouse Braine have recorded instances of the kind, and their experience fully coincides with my own. A well-known case may be cited in which a dentist administered gas to a menstruating girl in the presence of her father, her mother, and Dr. Richardson. Upon her coming to her senses the patient accused the dentist of having taken advantage of her unconsciousness to seduce her, and although her parents and the doctor assured her that they had never left the room,—they could hardly be supposed privy to the act, she maintained her assertion with the utmost persistence. It is unnecessary to adduce further instances, although it would be easy to do so, since the annals of medical legal practice afford abundance of material. Most practitioners will remember within the last decennium more than one case of a dentist who has been accused of criminal attempts upon patients, while the latter were under the influence of anæsthetics, cases the sequel of which is usually a spoiled life and a lost professional repute. For be it remembered that an aspersion of this sort cast upon a

professional man will injure if it does not ruin him entirely, and that whether he be proved guilty or innocent as adjudged by the voice of the law. "Where there is smoke there is fire." "There must have been something in it, or the charge would never have been made," are expressions which are apt to be made use of by thoughtless persons in connection with such charges, and are calculated to do irreparable injury to the person discussed.

When we consider the possibility of such charges being made, whether wilfully for purposes of blackmailing, or by persons labouring under a *bona fide* hallucination, we cannot be too careful about laying ourselves open to the revolting consequences liable to ensue, and I take it that an administrator of any anæsthetic, who being aware of the existence of hallucinations following anæsthesia does little short of moral suicide if he does not insist upon the presence of a third person during the administration.

THE COMBINATION OF METALS FOR FILLING TEETH.*

By W. N. WILSON, D.D.S., RICHMOND, IND.

NEARLY all agree that the combination of metals in certain cases is eminently successful in prolonging the usefulness of certain classes of teeth.

It is still an open question in the minds of some whether the advantages to be gained by this combination is therapeutical or merely the adaptability of certain metals to particular positions in the cavities.

Tin and gold have been used in combination for at least twenty-five years. They have been manipulated in two different ways.

First, as tin and gold forming a combination throughout the filling, or a part of the filling, finishing with pure gold.

Second, beginning the filling with and finishing with gold.

The advantages claimed are,

First, that it possesses the good qualities of gold as well as tin ; second, its ease of adaptation ; third, its nonirritability ; fourth, it is a poor thermal conductor ; fifth, that its therapeutical effect makes it a good preserver of tooth substance. The one disadvantage is its colour, while this is purely æsthetic it limits its use to such positions as shall not be discernable.

I have no doubt we shall agree with the above unless it is about the therapeutic qualities of the combination. There are several different views upon this part of the subject. By some it is claimed that dentine is hardened by the oxidation of the tin ; by others, that the electric current developed by the two metals in one cavity will render a certain definite territory thoroughly aseptic and that micro-organisms cannot live in the current. The gold is electro-negative and the tin electro-positive, there may be galvanic action but not to the amount claimed. The benefit derived is claimed by others to be simply the perfect adaptation of metals to the cavity.

It makes but little difference in which of the two ways the gold and tin are used. In using them homogeneously, I take a sheet of Ney's No. 6 soft gold foil, place a sheet of tin upon it and fold them and make them into cylinders to suit the case. A filling of this kind, when first finished will look like tin, but will be harder than tin and will become black. In the second case, the combination is made by beginning with pure tin at the cervical margin and finishing with gold ; in this case the tin retains its colour. It has been claimed if there is a very small proportion of tin used that it will be disintegrated and become a pasty mass, though rendering the space about the filling antiseptic. I think the combination first named is the best. It makes a much harder filling and does not wear away or cut out as the pure tin does. It is claimed this combination is easier of adaptation. Thermal changes do not affect the combination as much as gold. If there is any great benefit from the above combination over non-cohesive gold it must be in its diminished expense, its non-conductability and therapeutic effect

The combination of amalgam with gold was first used to make what is now called a patch filling. It was an effort to caulk a sinking ship. It was found to answer the purpose admirably, in fact it seems the amalgam does not act only mechanically but that there is also a therapeutic effect. I have repeatedly seen cavities which had been filled with gold

and failed and refilled with the same material and still at some vulnerable point decay would begin again, but after removing this decay and patching the filling with amalgam the decay would be entirely arrested, and I have never had to patch a patch. The amalgam becomes very black but does not discolour the gold, the dentine becomes dense, and I might say recalcified. In large approximal cavities, extending so far below the gum as to be almost impossible to make a perfect gold filling and finish it properly, it is better to put in your patch and finish it before you put in your gold. Dr. Clapp, in the December *Cosmos* of 1888, describes a method of combining amalgam and gold, securing a firm union between the two and completing the filling at one sitting. After carefully preparing the cavity, he adjusts a matrix so as to hold the amalgam absolutely in its place until the filling is finished. Fill the cavity with amalgam as full as desired, and then he begins with Steuers' plastic gold, the first few pieces will become amalgamated, after the surface is covered with plastic gold so the amalgam does not affect it, he finishes with any gold he wishes.

Dr. Clapp claims that gold is more liable, in large compound cavities, to fail at the cervical wall, and amalgam at that portion of the filling going over on to the grinding surface, and in the combination of the two you get the good results of both. Also, that the thermal and galvanic shocks are much less than when made of one of the materials, and that there is union between the gold and amalgam, so that you can depend on the amalgam for anchorage. In a few cases I have used the amalgam and the gold as a combination filling, after preparing the cavity, I partially fill it with the amalgam, but do not finish the filling until a future sitting, when I drill retaining points into the amalgam, using it as if it was a part of the tooth.

The cases in which it has been used have been universally successful. Operations of this character require careful and skillful manipulation ; too much care cannot be exercised. No filling material can make up for lack of thoroughness in all the minutiae.

ESCHAROTICS AND COAGULANTS.*

By DR. A. W. HARLAN, Chicago.

ESCHAROTIC—A substance which produces an eschar. A caustic. (Webster)—Caustic, destructive to the texture of anything ; burning, corrosive, pungent, to burn. Applied to animal substances it burns, corrodes or destroys the texture, an escharotic. “Escharotics, called also cauterants, are medicines which destroy the structure and vitality of the parts to which they are applied. The eschar which their application produces is followed by inflammation and suppuration of the surrounding tissues, by which the slough is separated from the living parts. They are employed—1. To effect the destruction of morbid growths, warts, condylomata, polypi, fungous granulations, etc.—2. To destroy the virus of rabid and venomous animals, and of chancres and malignant pustules, and to prevent their absorption. 3.—For the cure of violent inflammation, by their substitutive action, as when they are applied to the mucous or cutaneous surfaces, in gonorrhæal ophthalmia, erysipelas, poisoned parts, carbuncles, etc. 4. To stimulate iodolent sinuses, ulcers, etc.. where this influence is also of a substitutive character. 5. To form issues. 6. To remove morbid heterologous growths, as lupus, cancer, warts, etc. (Biddle). An escharotic applied to a morbid growth or the healthy tissue incinerates it, and renders it unfit for further use. The eschar will be thrown off—it cannot be converted into living tissues by digestion or absorption. It is useless to expect it to be reconverted into pabulum. It is a foreign body which cannot be encysted and remain harmless. It is waste. It can never again serve a useful purpose. To apply an escharotic in the sense in which it is here understood and defined, is to for ever destroy the part to which it is applied. When an escharotic is applied to a living pulp or the mucous, cutaneous or periodontal membrane, the part is destroyed, it is not converted into anything that will perform the function of the destroyed part. This ought to be thoroughly understood.

* A paper read before the Illinois State Dental Society.

Classification of caustics—(Farquarson).

PENETRATING CAUSTICS.

CIRCUMSCRIBED CAUSTICS.

Acetic Acid.

Dried Alum.

Bromine.

Dried Zinc Sulphate.

Chromic Acid.

Heat.

Mercuric Nitrate Solution.

Potassa with Lime (Vienna Paste).

Potassa.

Silver Nitrate.

Sulphuric Type-Acids.

To which may be added :

Zinc Chloride.

Caustic Soda and Lime (London Paste.)

Sodium Ethylate.

Arsenic Acid.

Carbolate of Potash.

Phosphoric Acid.

Aseptol.

Bichromate of Potassa.

Nitrate of Zinc.

Arsenious Oxide.

Nitro-Muriatic Acid.

Cold.

Electric Caution.

To the above list, which is long enough, no more additions of a useful character need be made, as the remedies cannot become readily available for instant use. "Acids unite with albumen in different proportions, producing acid albumins. When mixed with blood they not only precipitate albuminous substances, but decompose hæmoglobin, forming a substance which holds oxygen with more tenacity than hæmoglobin. They coagulate myosin and produce instantaneous rigidity in muscles. Sulphuric and phosphoric acids have, besides this chemical affinity, a strong attraction for water, and completely decompose the tissues to which they are applied, so that they are powerful escharotics. Nitric acid does not readily redissolve the albumen precipitated by it, and thus forms a barrier to its own action, so that it does not penetrate so deeply as sulphuric acid." (Brunton). In dental surgery the use of escharotics for their destructive effects is not very common, most practitioners relying on the knife for the purpose of removing small or large tumours and other excrescences. I do not intend to dwell on the general use of escharotics at great length, but rather devote my time to pointing out the abuses of escharotics in minor dental surgery. The most common abuse of escharotics may be found to consist in their application to exposed pulps and the periodontal membrane. In this connection it may be well to remark that this is not the form of abuse of escharotics which needs the severest condemnation, but it is in repeated application of such powerful medicaments

in full strength, or only slightly diluted, that the greatest danger lies. Their application to such finely organized structures as the dental pulp and the periodontal membrane, unless for purposes of total destruction, I deem to be unwise and contrary to our knowledge of the properties of escharotics. Escharotics in full strength should never be used on the normal dental pulp, the mucous or periodontal membrane. Escharotics are not indicated in pulpless teeth. A pulpless tooth may serve as a channel through which escharotics may be pumped or syringed into diseased tracts beyond the apices of roots, but if you wish to bleach a tooth well, do not use an escharotic in contact with the dentine, as it will prevent the diffusion of bleaching agents, until the charred organic matter is first mechanically removed. Powerful escharotics disorganize blood and blood serum, pus and living tissue as well, whether it be normal or pathological, hence the necessity for caution in their application to an already dead pulp, the bleeding end of the stump of a pulp, a serous exudation or pus flowing from an abscess beyond the apex of a root. Escharotics should be used to destroy exuberant growths, for stimulation of sluggish parts, and to prevent the absorption of pus or septic matter.

Coagulants—substances which produce coagulation. To cause to change into a curd-like or inspissated state, to thicken concrete, curdle. (Webster). All alcoholic tinctures are coagulants. All fluid extracts containing alcohol are coagulants. Some other substances (astringents) may coagulate albumen or blood serum to a degree unexpected by the users, as I shall endeavour to show at the conclusion of this paper. Rubefacients and vesicants are not always coagulants. Example, essential oils, chloroform, ether, etc.

Coagulation is sometimes produced by a feeble oxidation as by the air. In other cases by the formation of albuminous pellicles, as may be seen after the application of tincture of iodine or dilute solution of silver nitrate. Carbolic acid dilute, five per cent or 95 per cent produces a carbolate of albumen; this is a chemical change. Other coagulants act by their chemical affinities on the tissues to which they are applied, as by the abstraction of water, thereby concreting the substance acted upon. Coagulation does not always prevent the coagulum from being converted into new tissue, as may be noted in the healing of arteries and other well substantiated cases. The coagulum may be entirely absorbed without elimination.

Coagulation is a necessary condition before some articles of food can be digested. Some coagula may be converted into a lower order of tissue which will serve the purposes of protection, as witness the successful capping of pulps. A coagulum is however an effectual barrier to the immediate penetration of medicaments in roots of teeth for the purpose of disinfection, and should not be produced. It may become a source of future trouble by disorganizing in the presence of anærobie microbes.

Coagulation of blood serum or a serous exudation is one of the factors in pulp preservation. A successful treatment of many lesions of the mucous membrane and periodontal membrane, depends on the degree of coagulation produced by the application of coagulants. Coagulation is defined to be protective, not destructive. Violent escharotics, tissue destroyers, if used at all as coagulators, must be largely diluted. Many of the true escharotics are not freely soluble in water, hence the difficulty of properly diluting them to serve as useful coagulators. A pulp accidentally uncovered in excavating, but not bleeding, does not need a coagulator to protect it from the air, as the air is coagulant in a minor degree. Hence the $\frac{1}{1000}$ bichloride solution may be used without danger to its external covering. When the pulp is exposed and bleeding, first arrest the hæmorrhage by the use of a true astringent, then apply a feeble coagulating stimulant and cover without pressure. When suppuration is found, the neutral peroxide of hydrogen is indicated, which should be followed with a combination of non-irritant dressings, as Dr. Black's 1-2-3, solution of iodoform in ether or iodoform with essential oils. Carbolic acid, 95 per cent, is not indicated in a case of this kind. Aqueous solution of beta-naphthol or hydro-naphthol may be used. Wood creosote or guaiacol, likewise. A 10 per cent solution of resorcin or pheno-resorcin may be used with good results. Mucous abrasions, erosions and "canker" sore mouth need to be touched with glycerole of thymol, full strength, resorcin, acid aromatic sulph., 1-2-3; solution of permanganate of potash, $\frac{1}{500}$ corrosive sublimate or similar stimulating coagulants. That degree of coagulation of the surfaces of pockets around the roots of teeth which is best, is attained by the direct application of medicaments with a syringe or the introduction of finely-pointed medicated gelatine bougies, as recommended by Dr. W. B. Ames. Coagulation in cases of this kind, must not be destructive.

When possible, the coagulation should be accomplished by the use of substances soluble in water or alcohol—preferably in water. If the coagulant is dissolved in an acid it may cause trouble by rendering the cementum sensitive, and redissolving the coagulum before the acid is dissipated by the admixture with saliva. Coagulation should follow the cleansing of surfaces, not precede it. The coagulum should not be disturbed, nature will take care of that. Coagulators should not be applied to the pulp of a tooth every day, nor on the mucous membrane. It is not good practice to inject coagulators into pyorrhœa pockets oftener than once in four days. A coagulator should possess the following properties : Stimulating, alterative, anæsthetic, disinfectant and tonic when applied to assist in a return of the tissue to a normal condition. Coagulators should not be burners of tissue. Coagulators of albumen must be kept out of pulpless teeth. No necessity exists for their use in a pulpless tooth. Coagulation always prevents diffusion of vapours and vapourizable substances. Non-coagulators are indicated in this class of caes. Coagulators may be used in teeth containing living pulps as in many cases they are good pain-obtundents. A coagulator sufficiently powerful to curdle egg-albumen is potent for the arrest of pain in a living tooth. Powerful coagulators should not be injected into deep sinuses or abscesses having no external outlet, because of the pain produced and the danger from inflammation of subjacent parts. Such cases need to be washed or irrigated with neutral waters or very feeble coagulators in the beginning and these washings may be frequently repeated when no acute inflammation exists. The antrum of Highmore is a cavity into which it would be hazardous to inject a considerable quantity of a 10 per cent. solution of chloride of zinc, or a 20 per cent. solution of acid. aromaticum sulphuricum. Weak solutions of coagulators are indicated in chronic disease of the mucous lining of the antrum, until a decided effect is sought to be produced by medication, when double or triple strength of the medication is indicated. Syphilitic sores, when painful, must be cauterized or their surfaces coagulated, concreted. I will now perform a series of experiments on flesh with escharotics. The tissue used is from the calf. I will next show the action of coagulants on blood serum and egg albumen. These experiments will be followed with an exhibition of the action of non-coagulants on blood serum and egg albumen :

EXPERIMENTS—ESCHAROTICS.

Chloride of Zinc,	(Liquified)	On egg-albumen.
Chromic Acid,	"	"
Caustic Potash,	(Full Strength)	On Veal
Arsenic Acid,	"	"
London Paste,	"	"
Vienna Paste,	"	"
Phosphoric Acid,	"	"
Bichromate Potash,	"	"
Acid Nitrate Mercury,	"	"
Silver Nitrate,	"	"
Nitro-Muriatic Acid,	"	"
Sodium Ethylate,	"	"
Caustic Soda,	"	"
Glacial Acetic Acid,	"	"
Bromine,	"	"

COAGULANTS.

Peroxide Hydrogen,	(Aqueous Solution)	Egg-Albumen.
"	"	Blood-Serum.
Corrosive Sublimate,	(Solution 1-500)	"
"	"	Egg-Albumen.
Alcohol,	(Absolute)	"
Carbolic Acid,	(95 per cent)	"
"	"	Blood-Serum.
Iodide Zinc,	(Liquified)	"
"	"	Egg-Albumen.
Campho-Phenique	(Full Strength)	"
Black's 1-2-3	"	"
Carbolized Potash	"	"
"	"	Blood-Serum.
Tincture Iodine	"	"
"	"	Egg-Albumen.
"	"	"
" Comp	"	"
" Benzoin	"	"
" Myrrh	"	"
" Opium	"	"
" Chloride of Iron	"	"
Dialysed	"	"
Aluminium Chloride	(Liquified)	"
Aromatic Sulph. Acid	(Full Strength)	Egg-Albumen.
"	"	Blood-Serum.

Sulphate Copper	(Liquified)	Egg-Albumen.
Sulphate Zinc	" 1 to 8	" "
Creolin	(Full Strength)	" "
Creosote	(Morson's Wood)	" "
Guaiacol	(Full Strength)	" "
Spirits Camphor	" "	" "
Tannic Acid	(Aqueous Solution)	" "
Gallic Acid	" "	" "
Hydro-Naphthol	" "	" "
Beta "	" "	" "
Menthol	(Alcoholic Solution)	" "
Oil of Cade	(Full Strength)	" "
Resorcin	(10 per cent)	" "
Vinum Opii	(Full Strength)	" "
Listerine	" "	" "
Soziodol	(Aqueous Solution)	" "
Cologne Water	(Full Strength)	" "
Oleo-Resin Kava-Kava	" "	" "
Salicylic Acid	(Aqueous Solution)	" "
Lactic "	" "	" "

NON-COAGULANTS.

Oil Cloves	(Full Strength)	Egg-Albumen.
Oil Cinnamon	" "	" "
Oil Cassia	" "	" "
Oil Turpentine	" "	" "
Oil Camphor	" "	" "
Oil Cajeput	" "	" "
Oil Sassafras	" "	" "
Oil Gaultheria	" "	" "
Oil Sanitas	" "	" "
Terebene	" "	" "
Carbol-Camphor	" "	" "
Iodoform and Ether	(Saturated Solution)	" "
Boric Acid	(Aqueous "	" "
Chloroform	(Full Strength)	" "
Labarraques Solution	" "	" "
Liquid Vaseline	" "	" "
Sodium Fluo-Silicate	(Aqueous Solution)	" "
Permanganate Potash	" " 1 to 8	" "
Eugenol	(Full Strength)	" "
Eucalyptol	" "	" "
Myrtol	" "	" "

	Full Strength.	Egg Albumen.
Benzol		
Toluol	" "	" "
Glycerole Thymol	" "	" "
Boro-Glyceride	" "	" "
Phenol Sodique (Wildman)	" "	" "

NOTE.—Chloroform after it has been in contact with egg-albumen for some hours appears to be a feeble coagulator, one specimen of oil of cloves behaved in a similar manner. Eugenol after it has been exposed to the air for some months will produce a filmal coagulation, very slight it is true, but sufficient to rank it as a feeble coagulator.

CASE OF OLD STANDING FIXATION OF THE JAW—CURED BY OPERATION.

Under the care of Dr. JAMES DUNLOP.

Reported by Dr. S. G. CAMPBELL, F.R.C.S.E. (Exam.)

D. M'L., aged 28 years, from Inverness shire, was first seen on 21st June, 1888, and complained of inability to open the jaws.

History.—Family history is good ; has several brothers and sisters, all strong and well built.

Patient himself up to the age of 6 years was healthy, had perfect movement of the lower jaw, and no deformity had been noticed. At that age, while playing in the farmyard, a cart, partly filled with stones, fell, and the shaft struck him on the right side of the face ; he was picked up insensible, and was bleeding from both ears and nose, and also from a wound on the chin. He remained insensible for several days, and was taken 20 miles to see a surgeon, and only came to his senses in the consulting-room. The jaw was said to be broken, and a bandage applied.

At the end of six weeks the bandage was taken off ; the jaws were found firmly closed, and have remained so ever since—viz., 22 years.

Present Condition.—Patient is sparely nourished and anæmic ; he suffered much from dyspepsia, and has to be careful in the selection of food, which is mainly fluid. On looking at the face one is struck by the great want of development of the lower jaw, and the want of definition of the chin.

On examination, the jaws are found to be firmly closed, the molar teeth being in close apposition, while the incisor teeth of the lower jaw, which stand very considerably forward, are behind the incisors of the upper jaw, so that on looking from the front the teeth are seen to overlap. The left middle incisor tooth is absent, and through the space thus left the patient used to rub through what little solid food he took.

When asked to close the jaws, the masseters are strongly contracted, and a barely perceptible amount of movement takes place, apparently freer on the left side; no movement can be made out at either articulation.

Considering his condition, the patient speaks very well, and makes himself perfectly intelligible.

The patient has right-sided facial paralysis, which has existed since the accident.

The hearing is normal on the left side (20-inch watch test); while, on the right, there is a degree of deafness (8 inch by watch).

The arrest of development of the jaw appears to be much more marked in the body than in the ramus; and each angle is prolonged downwards, as a peculiar spine-like projection.

Diagnosis.—The condition was diagnosed as—Closure of the jaws dependent on fibrous or osseous ankylosis of the right temporo-maxillary joint, and possibly also of the left.

Treatment.—In the first instance an attempt was made to force the jaws gradually apart, by means of boxwood wedges inserted between the molar teeth, on each side alternately, with the smallest amount of success; the process, however, became so painful that it had to be given up.

On 12th July the patient was put under chloroform, and an attempt made, by means of two screw gags, to force the jaws asunder, without result, beyond demonstrating a slight degree of mobility of the left side of the jaw. The patient was then advised to submit to operation, and Professor Dunlop of the Royal Infirmary kindly undertook the case.

Dr. Dunlop, judging that the fixity probably depended more on the right joint, determined to operate on this first, and, if necessary, subsequently to attack the left.

On Christmas day, the side of the cheek having been shaved and the patient chloroformed, Dr. Dunlop made a curved incision, extending from a point a little external to the margin of the orbit downwards and backwards, parallel to the lower border of the zygomatic arch for a short distance, then directly

downwards over the ramus of the jaw for about an inch ; the temporal artery was thus avoided. The incision was carried down to the bone. On clearing this it was found that there was no demarcation between the jaw and the temporal bone. The parts corresponding to the zygomatic arch, the condyle and the coronoid process, were all fused into a mass of dense ivory-like bone. The posterior border of the ramus was then defined, and the parts representing the condyle and coronoid process were chipped away with the chisel, until a gap of about $\frac{1}{4}$ in. was left between the skull and ramus of the jaw.

Smart hæmorrhage took place at this stage from the depth of the wound, but was arrested by means of a plug of lint dipped in solution of perchloride of iron. The jaws were now forced apart with considerable difficulty, but with a gratifying amount of success, as they separated to the extent of fully one inch. A cork was inserted between the teeth, and the wound dressed.

The subsequent course of the case was as follows :—The wound was dressed on the third day, and, subsequently every few days, and gradually healed by granulation. After the third day the cork was replaced by a wooden wedge, and the patient was directed to work the jaw both by means of his hands and unaided muscular effort. After the twelfth day the patient was furnished with a thick piece of india-rubber, which he wore between the molar teeth, and was directed to practise chewing this.

The following was the condition of the patient as noted 11th March :—The external wound is almost healed ; the patient can separate the jaw three-quarters of an inch unaided, and by means of his fingers to fully an inch. He has good power over the jaw, and can crack nuts between the molar teeth. He eats solid food of any kind, and performs the movements of chewing very satisfactorily. He expresses himself as delighted with the result.

APPLICATION FOR TEETH PAINFUL TO THE TOUCH.—The *Dental Review* recommends wine of opium, one or two drops injected along the side of a root, when the tooth is painful to touch, stating it will allay the pain. The same quantity will relieve pain after the removal of serumal deposits. Do not inject *into* the tissues, but into the pockets.

CARIES AND NECROSIS IN THEIR RELATION TO
PRACTICAL DENTISTRY.*

BY J. H. MARTINDALE, M.D., D.D.S., Minneapolis, Minn.

IN being permitted this evening to invite your attention to the subject suggested by your committee, "Caries and Necrosis of the Jaws and Alveolar Structures," I do so with the knowledge that I shall be unable to present anything very new or valuable as to the etiology or management of these conditions which, although highly important, consist of a topical and systematic treatment which, for the last few years have changed very little. I trust, however, that as long as the established truisms of medical science with respect to caries and necrosis are so comparatively little understood and practised as at present, you will excuse me if my treatise presents very little of scientific hypothesis or surmise.

Before we can intelligently consider caries or necrosis as an affection of the jaws and alveolar structures, we must first consider it as affecting osseous tissues in general. In a pathological sense, diseases of the bone are identical with those of other tissues, while such differences as exist are due to their anatomical and physiological peculiarities, diseased action under all conditions being materially modified by texture. In the bones diseased action is thus modified by the presence of the inorganic material which they contain, two-thirds of their constituents being earthy and one-third animal.

This animal proportion of the texture of the bones includes a fibrous periosteal membrane with cellular tissue beneath: and in the long bones of an endosteum or inner periosteum, which lines their medullary canals. With this latter class of bones this paper has no concern, hence the subject of osteomyelitis, or the "inflammation of the bone marrow," as Thomas Bryant designates it, although a subject of the most intense importance and interest to the general or orthopædic surgeon, will not be touched upon here.

Caries, or necrosis of the jaws and alveoli, always point to an antecedent condition of inflammation, although it by no means follows that inflammation of the jawbone has, as a necessary sequela, caries or necrosis of the same. As inflammation can only pertain to vital animal substances, the

*Read before the Chicago Dental Society and reported in the *Dental Review*.

process of inflammation in bone can be found only in that organic vital plasma so inexplicably and mysteriously blended with minerals to form the bony tissues of the animal organism. In the jaws this substance is found in the periosteum, the bone cells, and the inosculating of their canaliculi, and in the circulatory system of the Haversian canals. With the tangled network of fact and hypothesis that at present constitutes our acquaintance with the subject of inflammation, it is unnecessary that I should here burden you. Let it suffice to say that when inflammation of this highly vascular periosteum has been induced in the maxillæ or alveolar appendages thereof, by traumatism, septic infection, cachexia, or by specific mineral poisons, and proceeding through the successive stages of increase of blood to the part, multiplication of leucocytes and congestion, finally reaches complete stasis, so that nutrition from a definite and considerable area of bone is suddenly cut off, *necrosis* must then inevitably result. If on the contrary, complete arrest or capillary infarction shall not have been reached, but the blood current has been slowed, and the interstitial portions of bone have become the seat of foreign elements and the scene of perverted nutrition, we reach the stage so admirably described by Dr. Ingersoll, whom I now quote.

Speaking of the transudation occurring in congestion he says:

"Red corpuscles follow the white, but not in such large numbers. Stagnant blood in which the corpuscles are dead also passes out. From the damage done to the vascular tissue, and to the contiguous cellular tissue, there is a debris left to mingle in the flood of disorganized material which constitutes pus. In addition to the matter which is the result of the disorganisation of tissue, there is, according to modern discoveries, a large emigration from without, in form of micro-organisms of various types, considered to be exopathic causes in the formative processes of developing pus." Professor Dalton, in his physiology, tells us that this intercellular or interstitial area which we see by Dr. Ingersoll's apt description has now become the field of such strained conditions and anomalous elements, in the *normal* state of circulation is filled with interstitial fluid, which is the source of nutriment for the solid parts surrounding it, and is renewed by constant change. As fresh supplies are drawn from the circulating blood, the older portions are removed by absorption and returned to the

centre of circulation by the lymphatic vessels. Now, if the condition described has been reached, we find that the interstitial area of bone so effected presents a very chaotic mixture, embryonic cells, blood corpuscles, dead blood cells, and the debris of the tissue involved in the inflammation. We have present as you see *re-constructive* and *destructive* elements we are viewing the ultimate battle ground of tissues. In proportion now to the *natural vital force*, of the human subject in whom these changes are taking place, and his predispositions of cachexia, we view either the wonderful up-building of molecular form of new tissues, or tissue death, molecule by molecule being cast off with pus in the form of dead bone-earth; this we call *caries* of bone. If I succeed to any degree in differentiating the causes and progress of caries and necrosis, it is perhaps the most valuable purpose this paper could possibly subserve. The terms, as I know, are too often used by dentists interchangeably and with very loose conceptions of what really constitute their respective distinctions. No doubt necrosed areas of bone are often found in connection with caries, and as a result of the progress of that disease, having insulated as it were small territories of bone, and by thus cutting off their blood supply causing necrosis. According to the definitions in the books *necrosis* is a condition analogous to gangrene, or slough in the soft parts, and *caries* is described as a condition of the bones similar to that of ulcerations in the soft parts, with the exception that the disintegrated bone-tissue contains bone earth, and this debris acts as an irritant in the tissues, exciting the florid granulations which grow so plentifully from the surface of a sore, or fistula over a portion of carious bone. Caries presents a spectacle similar to that of a well-contested battle-ground where life and death are closely contiguous. Here a molecule yields, dies, and is carried off in the torrent of pus and death waste, and right beside it is a healthy molecule waging valiant defence against the usurper. In necrosis, to the contrary, the defending forces, represented in bone as we have previously stated by the lacunæ, their canaliculi, and the Haversian system of vessels, find themselves like besieged soldiers in a barracks sorely oppressed by the enemy, their sources of nourishment from without having been completely cut off; they surrender the barracks *en masse*, and leave it dead and tenantless—a mere mass of mineral matter like the coral in

the museum, once the abiding place of animal life, now an empty skeleton.

Holmes says in his *System of Surgery*, "When a portion of bone is to die, the first phenomenon is the cessation of circulation in it. This leaves it hard, white, and sonorous when struck. It does not bleed when exposed or cut into, and is insensible." It is very frequently the case, that the periosteum immediately covering the area of bone thus necrosed is lifted up by an effusion of inflammatory products, but instead of dying, its bone producing cells being irritated to an excessive activity, proliferate a film of bone which encloses or invaginates the dead bone, requiring that we should cut and penetrate this new bone ere we remove that which is dead beneath it. In the lower jaw also, which as you know consists of an outer and an inner plate, which are of very dense and compact osseous tissue, enclosing a cancellous portion, these plates, especially the external plate, are bulged out by the inflammatory effusions beneath, forming a tumour appearance which when pressed will frequently be found to be so thin that it will readily yield beneath the finger—I, in my practice, very frequently find this condition presenting as a result of acute inflammations of the bone resulting in effusion. Later on if resolution does not occur the said effusions will form for themselves an outlet and this bulged out plate of bone will collapse. In other instances the effusions being capable of organisation into new products, the cavity becomes filled with dense bone, and a permanent bony tumour is the result. Having attempted thus far to trace pathologically the progress and nature of these diseases as presented in the maxillary bones, let us now enquire into some of these blood taints or cachexiæ which especially predispose to, or directly cause necrosis and caries—among them are the exanthematous diseases common especially to childhood (measles, scarlet fever, chicken pox, etc.). In them exfoliation of a considerable portion of the alveolar process involving the deciduous teeth therein contained, and even the follicles of the permanent ones is by no means uncommon; especially does it follow measles, commencing subsequently to the active stage of the disease, in tenderness of the gums, fœtid breath, but no severe inflammatory action, the gums recede from the teeth, and bare bone is exposed, this exfoliates, and leaves a gap in the jaw, which is gradually filled up with new bone. Of late years the atten-

tion of the writer is being more and more called to the prevalence of caries and necrosis as a result of inflammation aroused by traumatism, or other means, in the bones of scrofulous persons, or those of tubercular diathesis. In such cases modern authorities tell us, the cell proliferation which is the natural consequence of the inflammation resulting from a contusion of the tissues, in place of quickly taking on a reparative action, has a tendency to hyperplasia reverting to embryonic conditions and so to a nesting or bunching of cells such as is often met with in the medulla of bone in tubercular affections of the osseous system; the reversions to an embryonic type, are *apparent* only, as these cells are doomed in the majority of cases to death and degeneration. Cases of this kind have several times presented themselves in my practice, and later on I shall quote some of them in detail from my case book.

Constitutional syphilis is a predisposing condition to necrosis, and such a case as that cited by Mr. Christopher Heath, in his work on "Diseases of the Jaws," where a dentist had a suit brought against him for a case of necrosis, ensuing as the result of an extraction of a tooth, the patient being syphilitic, is not uncommon. A large number of the cases, however, which are usually ascribed to syphilis probably are induced by the great amount of mercury and iodide of potassium, which are the drugs so extensively used in its treatment. No inconsiderable number of diseased skulls and other bones to be found in our museums, exhibit the results of mercurial poisoning. Mahomedans and Hindoos, in various parts of Hindostan, believe that mercury is a specific for fever and for that purpose it is given in a most reckless manner, with the result of inducing extensive necrosis of the skull and other bones. Especially when used so freely as is even now in our own country so common by inunction, we may not infrequently witness symptoms simulating those of secondary syphilis, but which are really due to excessive mercurialisation of the system.

The writer himself has a patient who assures him that when a few years ago at the Hot springs he was treated most heroically for syphilis by inunction; he could frequently discover little globules of free mercury in the creases in the palms of his hands, and coins carried in his pockets at that time were silvered over with a mercuric amalgam.

McNamara, in his work upon the bones, states that mercury

has been found in its free metallic state in the bones, and thinks that by blocking up the small vessels and canals of the osseous tissues, it so interferes with the circulation of a part as to result in death of the bone. Necrosis of the alveolus during the administration of mercury, however, may occur from a different cause, depending upon the condition of the gums through which the supply of blood to the bone is largely supplied. If profuse salivation exists, the ulcerating and sloughing condition of the gums must largely interfere with with the flow of blood to the alveoli of both upper and lower jaws; and so the occurrence of necrosis of bone in this locality is explained precisely as we see in cases of *cancrum oris*. Another mineral poison with specific tendencies to effect necrosis of the jaws is phosphorus, the fumes of which inhaled by workmen in match factories, induce the most extensive necrosis, the remarkable feature being that through some peculiar affinity existing between the poison and tooth pulps exposed by decay, the workmen are said to breathe the phosphorus fumes with comparative immunity as relates to necrosis if only their teeth are free from decay or kept properly filled. But of the foregoing disease, as it is of very infrequent occurrence in this part of the country, we shall treat no further in this paper.

DR. HARLAN'S TOOTH PASTE.—We are asked to give Dr Harlan's formula, which we append. It is an example of the much belaboured "polypharmacy" but nevertheless is useful

R. *Cretæ Precip.*

Pulv. Oris Rad. <i>aa.</i>	...	...	ʒii.
Pulv. Saponis Cast. alb.	...	...	ʒss.
„ Os. <i>Sepiæ</i>	...	...	ʒii.
„ Myrrhæ	...	...	ʒi.
„ Sacch. alb.	...	..	
„ Boracis, <i>aa.</i>	...	...	ʒi.
Carminæ	...	...	grs. x.
Ol. <i>Gaultheriæ</i>	...	...	ʒi.
Glycerine	...	...	
Honey, <i>aa.</i>	...	...	ʒi.
M. ft. paste.			

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A DISCUSSION UPON ANÆSTHETICS IN DENTAL SURGERY.

It is undoubtedly valuable to take stock from time to time, of our knowledge concerning the bye-paths of Dental Practice. We may then welcome as a useful summation of the experience of the profession the recent discussion upon Anæsthetics at Brighton. The matters dealt with comprise Sulphuric Ether in the dental surgery, Chloroform, Nitrous Oxide, and anæsthetic mixtures, under which heading, were dealt with Nitrous Oxide and Ether and the A.C.E. Mixture. The paper dealing with Ether did not perhaps cover so wide a range as we in England might be inclined to desire, but its conclusions were certainly in harmony with the established practice in London. With regard to Chloroform as an anæsthetic in dentistry, we have so often condemned its use and pointed out the dangers attendant on its employment that Mr. Norman McLeod, who took up the cudgels on its behalf for the honour of "Auld Reekie," must forgive our emphatic verdict of "non-proven" to his contention in Chloroform's favour. That occasion *may* arise when Chloroform must be employed for dental operations, we are of course, willing to admit, but we hold with Mr. Hutchinson, who pointed out the advisability in all such cases of insistence on the part of the dentist, that the patient should be attended at his own house, and operated upon in the the recumbent position, with all tight clothing removed, and in fact, the same precautions taken as if a major surgical-operation were to be performed upon him.

Passing to the subjects of Nitrous Oxide and its mixtures which were treated in two able and interesting papers by Drs. Dudley Buxton and Frederick Hewitt, we find much matter for serious reflection and careful study.

The well-known papers on the Physiological action of Nitrous Oxide, contributed some years ago by Dr. Dudley Buxton to the Odontological Society were upon the present occasion supplemented by a consideration of their practical bearing upon the routine administration of the gas. Arguing that if it could be shewn, as the Doctor contended he had proved, that Nitrous Oxide is not a heart depressant but a heart stimulant, and that it possesses no asphyxiating qualities, there ought to be no manner of fear in administering it, whether in health or the minor conditions of disease, and in short, that it is not only theoretically but actually a safe and reliable anæsthetic, with a range of applicability far wider than has generally been allotted to it. The value of this vindication of Nitrous Oxide is very great, not so much perhaps from the point of view of the dentist, for most dentists are alive to the merits of Nitrous Oxide, but because it will afford tangible evidence to place before medical men, when they, as they so often do, forbid their delicate patients from inhaling the gas, for fear of some hypothetical evil consequences, which according to them may ensue. The introduction of the Alcoholic Anæsthetics into Dental Surgery arose from the wish to prolong the period of unconsciousness given by Nitrous Oxide, and in London a mixture which found most favour with Mr. Clover, and has given satisfaction to Mr. George Bailey has been Nitrous Oxide followed by Ether, and when skilfully managed this combination is certainly difficult to improve upon. However the possible supervention of nausea and a lingering, unpleasant flavour of the alcoholic anæsthetics has led many persons to deprecate their employment at all in Dental Surgery.

Dr. Hewitt in a singularly perspicuous manner undertook to shew the merits of a gaseous mixture, viz., that of oxygen with Nitrous Oxide. The idea is by no means new, havin_g

been advanced by Paul Bert and others on the Continent, is fascinating enough to make one hope that a larger experience may confirm the good opinion which Dr. Hewitt's initial investigation has led him to form. Of course many thousands of operations will have to be carried out under its use before an adequate judgment upon its merits can be arrived at. At present the method possesses some drawbacks which possibly time may remove—the apparatus required for its use is cumbersome and cannot be controlled by one person, while it seems difficult if not impossible to tell with any degree of certainty, when the patient is sufficiently unconscious to proceed. In Dr. Hewitt's hands, the following advantages have been found to occur in many if not all instances. The Anæsthesia has been quiet, free from jactitations, the period of unconsciousness more prolonged, the comfort of the patient more pronounced. According to Continental observers, when this mixture of gases is employed unless under more than the usual atmospheric pressure, these desirable results have not so often been obtained. All persons who have a knowledge of the introduction of Anæsthetics will not however attach too much importance to diversities in opinion, for it has nearly always occurred that as methods of administering have improved, and greater knowledge been obtained initial difficulties have vanished. The consensus of opinion of those who read papers, and of those who took part in the discussion would seem to point to the following conclusions :

1. Nitrous Oxide should be the routine anæsthetic in Dental Surgery, and that its use should seldom if ever be discountenanced in disease.

2. When prolonged anæsthesia is desired, Ether should be employed.

CREOLIN AS AN ANTISEPTIC.—Creolin, one of the new antiseptics, is a very feeble coagulator of albumen, five per cent emulsion or solution can be made with water. It is a good dressing for wounds, and it may also be injected around roots of teeth in many cases with great benefit. Creolin, 10 drops ; water 50 drops. Makes a milky emulsion, which will stand unchanged for many days. Saturate a pellet or rope of cotton with the above, touch one end of it with iodoform and press into an opening in the gum, or sinus, if you wish to prevent it from contracting or closing.

A NEW COMPOUND ANTISEPTIC.—The *Dental Review* gives yet another “polypharmacy” preparation in the following form ; Dr. Emil Rotter is responsible for it :

Corrosive Sublimate	...	..	5 parts.
Chloride of Sodium	...	...	25 ”
Carbolic Acid (Crystals)	...	...	200 ”
Chloride of Zinc	...	...	500 ”
Sulphocarbolate of Zinc	...	...	500 ”
Boric Acid	...	...	300 ”
Salicylic Acid	...	...	60 ”
Thymol (Crystals)	...	...	10 ”
Citric Acid	...	...	10 ”

This is soluble in water. One-half of a Troy ounce may be dissolved in a quart of water, when it will give a clear solution. As a disinfectant for water closets, spittoons, &c. it might prove useful, as well as for use as a mouth wash. Possibly Dr. Rotter believes if he misses fire upon the germ, with one antiseptic, the other will wipe his eye.

A METHOD OF GOLD FILLING.—Dr. A. Robinson advocates the following plan. Thin platinum is burnished to fit the cavity. It is removed and filled with melted gold and then cemented to place. It may be used to great advantage in extensive buccal cavities where it is difficult or impracticable to apply the dam.

A WARNING AGAINST COCAINE.—Dr. Pruyn, who has made a very careful and valuable research about the matter, warns earnestly against the fascinating and seductive dangers of cocaine. He says the cocaine habit is far worse than alcohol or morphine ; the demand will not be denied. Especially he warns against the danger of self-injection. Dr. Pruyn says that no man should use cocaine in his dental practice who has not studied its effects upon the lower animals, even to death. In that way only can he recognise all the symptoms and know their value and indications.

CEMENT.—An exchange recommends to repair cracks of torn places in rubber articles with the following cement :

Sulphide Carbon	16 parts
Gutta-percha	2 parts.
India Rubber.....	4 parts.
Fish Glue.....	1 part.

Draw together with stitches, if necessary, and apply several coats.

MOISTURE-TIGHT GUTTA-PERCHA FILLINGS.—The *Dental Cosmos* credits Dr. J. G. Templeton, of Pittsburg, Pa., with the following hint. Dissolve common resin in chloroform, and keep it at the consistency of varnish. After properly preparing the cavity, wrap a very little cotton on an excavator, dip in the solution, and neatly varnish the floor and walls of the cavity. Quickly pack the suitably-softened gutta-percha with a cold plugger, and trim the borders with thin hot instruments.

A DENTAL ASSOCIATION FOR NEW ZEALAND.—We learn that at a meeting of dentists' delegates, which has been held at Wellington, a Dental Association for New Zealand was formed. The first Annual Meeting of the Association is to be held at Dunedin during next January. Mr. Boot, of Dunedin, is elected President ; Mr. Edwin Cox, of Auckland, Vice-President ; and Mr. Frank Armstrong, of Dunedin, Secretary and Treasurer.

THE COLOURING MATTER OF AMADOU :—Dr. Freeman, of Chicago, says amadou is an important adjunct in many dental operations. He thinks it has too much colouring matter to be used for a final wiping of cavities just before filling. Often you cannot use a napkin in the mouth of a child, and some will not tolerate the rubber dam. In such cases, on the lower jaw, let your assistant hold a piece on the lingual surface of the teeth, while you hold a similar piece on the buccal surface. Cut your pieces ; do not tear them up lest some unevenness gets in your cavity or obstructs your seeing your work. Let the lingual piece stand a trifle above the crowns of the teeth lest the child allow saliva to enter the cavity by swallowing. If you are inserting amalgam fillings on buccal surfaces, use a narrow piece to keep your filling up to the cavity while you push it in. In superior proximal cavities, hold a half inch square loosely near the tooth to be filled, and place your filling material upon it and you can readily slide it into your cavities—better than amalgam cups or shooters. Keep a lot of small cubes, size three-eighths inch more or less, to smooth off excess or to press filling in. Follow with a burnisher.

THE UNSKILLED ACTING AS DENTISTS IN THE ARMY AND NAVY.—On a lad joining the services particular care is taken that he possesses good teeth, but the moment he is enlisted he is left to look after his molars the best way he can. For many years dentists have been endeavouring to obtain for their profession a recognized status in the Army and Navy, but so far without much success. Ships' stewards are according to Dr. Cunningham somewhat eager to perform the duty with zeal. One man showed him two pickle bottles full of decayed teeth that he had extracted in ten months. The fare upon which Tommy Atkins and our Jack Tars subsist is one which demands sound teeth, so that it is not asking much of a paternal government which insists upon the teeth of recruits being sound, if we demand for the rank and file skilled and sufficient aid for their teeth after enlistment.

A QUAIN ADVERTISEMENT.—We are indebted to a correspondent for the following :—

“ Oxford, December 6, 1777.—Wanted immediately, Two Front Teeth in the upper jaw, for Transplanting to another Person : they might be of a middle size and beautiful white, without any blemish in the enamel : whoever will dispose of such Teeth, and have them drawn by Mr. Dentist, at the time he shall appoint for it, shall receive of him One Guinea, and Mr. will supply the vacancy with artificial ones, made with enamel so as not to be distinguished From Human Teeth, and shall answer the Person the same Purpose as natural ones.

Mr. recomends his Dentifrice for the Teeth and Gums ; The efficacy of the above is sufficiently known in the university, and most Capital Places in England, it is therefore needless to describe its Particular virtues. Sold by Mr. and Mr. in Oxford.

MAKING PLASTER IMPRESSIONS.—Dr. C. J. Gramm writing in *Archives of Dentistry* says :—While forcing the cup into position, let the patient change from the upright posture to one bending forward at an angle of 45°, allowing the head to drop on the chest. The annoyance of “choking” will thus be avoided.

TO HIDE THE NECKS of Anterior Superior Teeth exposed by Recession of the Gum.—When, from excessive brushing or other causes, the gums have receded leaving the necks of the anterior superior teeth exposed, Dr. A. H. Thompson (Topeka), makes an almost imperceptible restoration to natural appearance by inlays of gum-coloured porcelain, to which he gives the fullness of the natural gum. By careful selection of the proper colour, making from the gum-portion of artificial teeth, grinding to the proper thinness from the tooth-body side, and setting in cement so coloured as to still further assist the disguise, a most perfect restoration to normal appearance is made.

DENTAL CONGRESS IN PARIS.—About 400 French and foreign practitioners in dentistry attended the meetings. Professor Gorial, in his opening speech, compared the position of dentists in the present day to that of the barber-surgeons of old, inasmuch as they were held in suspicion by the Faculties. The speaker hoped, however, that this state of things would be remedied by the granting of diplomas by the Parisian and other Schools of Dental Surgery. After this address, which was delivered on the part of the Government, the Head of the Dental School was elected President of the Congress. The Committee which has arranged and organized the Congress gave a most brilliant reception to the foreign delegates. A number of well-known medical men attended the reception in the grounds of the Ecole Dentaire, where a good band discoursed sweet harmonies.

COMPOSITION OF LISTERINE.—The merits of Listerine as an antiseptic make it a matter of interest to learn its composition. It is reputed to be made up of

Benzoic Acid	...	...	120 grains.
Borax	...	...	120 „
Boric Acid	...	...	240 „
Thymol	...	...	40 „
Eucalyptol	...	...	10 drops.
Oil of Peppermint	...	...	6 „
Oil of Thyme	...	...	2 „
Alcohol	...	...	8 fl. oz.
Water enough to make	...	...	32 „

EFFECTUAL STERILISING OF ROOT CANALS.—Dr. J. H. Wooley says that after the work of disinfection has apparently been done by drugs, and we consider the root in condition to fill, application of a heated broach will frequently reveal the characteristic odour of sulphuretted hydrogen showing that decomposition still lurks in the canal. This can be more effectually overcome by the aid of the heated broach than by any other method.

HOW TO PREVENT VULCANIZED RUBBER SHRINKING FROM THE PINS OF TEETH.—The reasons for rubber shrinking from the teeth after vulcanization are thus stated by M. Polscher.

1. The teeth have not been thoroughly freed of wax.
2. Careless packing.
3. Imperfect closure of the flask.
4. The flask was not held under a continual pressure from beginning to end.

The best remedy lies in the study of the causes, and is apparent :

1. Thoroughly remove all wax.
2. Pack carefully.
3. Close the flask perfectly.
4. Keep the flask under continual pressure.

The last two points are especially important.

In addition to these precautions, the following will be found of advantage :

1. When possible, grind a groove with a corundum disk, between the pins and the margin of contact of the rubber.
2. Roughen the surface of the tooth above the pins.
3. Moisten the teeth and pins with a solution of rubber dissolved in benzine.
4. The entire surface of the teeth, where the rubber comes in contact, may be roughened by the application of fluoric acid. It should be applied with a piece of wood, and care should be taken not to touch the pins with it. Fluoric acid is found in the market in gutta-percha bottles, and may be procured at any dental depot.

DEFORMITIES OF THE JAWS AND TEETH IN IDIOTS AND OTHERS.—THE association of the V-and saddle-shaped jaw with idiocy has been frequently pointed out in papers such as those of Cartwright, Oakley Coles, Ireland, and Langdon Down ; but, according to the statistics of Dr. Talbot of Chicago, these are not the only forms of irregularity met with, nor is it true that idiots present the most aggravated deform-

ities of jaws and teeth. In his tables he excludes those deviations from the normal which might be considered due to a local cause, and only takes those of constitutional and developmental origin. The subdivisions comprise large jaw, protrusion of upper jaw, high arch, V-shaped arch, thumb-sucking, saddle-shaped arch, and small teeth. Of nearly 2000 cases examined in idiot asylums, almost one-half of the whole number had irregularities of the jaws and teeth, whereas in 1000 cases of healthy children only 22 per cent. suffered in this way. Next, taking 2000 cases of deaf and dumb persons, 45·3 per cent. presented oral deformities, and of a small number of cases in asylums for the blind there were 50 per cent. Examinations of the mouths of 700 insane patients revealed the fact that only about 12 per cent. were irregular, and these were among cases of the congenitally insane, or those who had become insane early in life. Dr. Talbot observes that there has been brought forward evidence to show that when idiocy appears in a family other members may be found scrofulous, deaf, dumb, blind, or insane, showing that the conditions indicating neurotic tendencies have been transmitted through generations; and while specialists have generally recognized only one common feature—a very low grade of cerebral development—his investigations concerning the osseous system in its relations to the irregularities of the jaw and teeth show a lesion common to all those conditions. The small percentage of deformities in the insane examined is due to the fact that, with few exceptions, insanity does not appear in the individual until the skeleton has attained its normal development.

A HINT FOR TREATMENT OF POCKETS AROUND THE ROOTS OF TEETH.—Dr. W. B. Ames recommends the use of shavings of medicated gelatine bougies for application to pockets around the roots of teeth. The same authority finds that finely pointed bougies may be passed into fistulæ from the roots of teeth, and that rapid healing will take place from the bottom, much more satisfactorily than when injections of medicines are made. This is a cleanly method, and worth trying.

A PRACTICAL EXPERIMENT WITH IODOFORM AND COTTON WOOL.—The following extract from the *Dental Review* possesses considerable interest from its bearing upon the discussion upon antiseptics which took place not very long since at the Odontological Society. A filling that had been inserted nine years ago, was recently removed from a pulpless tooth, and the pulp chamber found to be filled with cotton and iodoform. The cotton had a slight yellow tinge, a decided odour of the medicament, and a small amount of moisture was present, but the root canals were clean and peroxide of hydrogen showed no evidence of septic matter. The tooth had given no trouble to its possessor since the filling was inserted, and the sole reason for disturbing the amalgam was the dark colour of the tooth substance. Evidently, this practical experience does not sustain the experiments of recent scientific investigation regarding the antiseptic properties of this drug.

ALUMINIUM PLATES WITH VULCANITE MOUNTINGS.—Light, durable, strong, cleanly, and slightly, these dentures are found to be very satisfactory to both the patient and the dentist. To this end it is necessary that the plate be kept from casual contamination while the process of construction is going on. When, therefore, by the means just described a perfectly clean plate has been struck up, a sharp-pointed graver is used to scratch and to spur in opposite directions the ridge surface which is to be covered by the rubber; and if the roughing be rightly done, it is both needless and unsightly to perforate the plate, for the adhesion will be certain and secure. After the teeth have been waxed upon the plate, and just before investing the piece, varnish the plate on both sides with sandarac varnish. When vulcanized, be careful not to disturb the varnish until the vulcanite has been properly polished. Then immerse or wash the denture in alcohol, which will remove the sandarac and also improve the appearance of the vulcanite.

Abstracts of British & Foreign Journals.

INTERNATIONAL DENTAL JOURNAL.

RETAINING PLUGS USED IN REGULATING.

Wire Retaining Pegs.—Wart Retaining Fillings.—Philosophy of Excavation.

By J. N. FARRAR, M.D., D.D.S., NEW YORK.

FOR some cases, if nicely made, these auxiliaries may be classed among the very best devices for retaining purposes.

Wire retaining Pegs.—Pins to be fixed into cavities are of gold or platinum wire, one extremity of which is roughened or screw-cut and the other smooth. When there are natural cavities, pins are easily set with cement : but if the holes are to be drilled for the purpose they should not be so large as to make it necessary to have a ring of cement around the pin to be exposed, nor so small that the threads of the screw will crumble the enamel. It is very important that the bearings of the screw or pin, when pressed against by the recently moved tooth, should rest against the tooth tissue at the entrance and also at the bottom of the cavity and although in contact, not to rest on the cement in which it is set. It is necessary in order to obtain firmness, however, to shape the pit so that there will be a little extra room in other places for a small quantity of cement. When the dentine is thick enough, this chamber should be made entirely within it, not sacrificing the enamel. In this way the fulcrum, which is the enamel, will be strong and not crumble. After the corrected teeth have been retained in place long enough the pegs should be removed and the cavities filled with gold. *Wart retaining Plugs.*—When teeth overlap, they may sometimes be retained in position after correction by simply inserting wart-plugs in natural cavities, if there are any in the approximal surfaces or in artificial cavities if the urgency of the case demands it, which is seldom. The durability of wart-plugs depends entirely upon the skill exercised in the operation ; The plug should be made of adhesive gold inserted after the

laminated method of filling teeth *i. e.* the foil should lie like the leaves of a book, one piece flat upon another, beginning at the posterior part of the cavity and extending outward. Beginning the operation in the usual way against the cervical wall of the cavity with soft foil, it is followed by piece after piece of laminated gold, cut either from a carefully prepared roll, or better, from ribbon made of several thicknesses of cohesive sheets (perhaps heated). These are malleted together at all points, but more especially at the outer ends of the pieces, in order to bend them toward the gum, and give a solid surface. When the cavity is nearly filled, a key, of roll or rope foil, is forced into the undercut. This key renders the wart-plug very secure, and when all is properly finished and polished, it is not objectionable to the eye. This method of cutting a hatchway through the anterior portion of the tooth renders the operation of filling easier than to operate from underneath, leaving no disfigurement of the tooth. Dr. Farrer believes that a filling should never show if possible; the dictum is not always sound, for gold thus inserted between the teeth often reflects a dark line to the eye which, had the gold been made to extend a short distance around on the anterior surface of the tooth, would form in the light a bright line which would catch the eye and render the dark line beyond unobserved. This form of plug is more durable, and causes no disfigurement. *Philosophy of Excavation minutely considered.*—In the preparation of the cavity to excavate in accordance with the “cleavage,” or “grain,” so to speak, of the enamel, is an important point. In preparing the dentinal portion of the cavity when the pulp is exposed, it is well also to cut away the walls and floor, so that not only the filling, as a whole, may be firmly anchored, but that the ends of all dentinal tubes, leading directly from the cavity to the pulp, may be covered with varnish (the best kind of which is fir balsam dissolved in chloroform). But to accomplish this double object, all cavities in the grinding surfaces of teeth, where great pressure is to be made, should, if possible, be so shaped that when the zinc cement base is inserted and has hardened, it may rest firmly, not to bear hard upon the thin dentinal flooring over the pulp, nor upon the capping varnish, if any is used, but upon the centrifugally inclined floor of the walls of the dentinal structure around about. In approximal cavities, this precaution is not necessary. In case of exposed pulp, having applied wood creosote and deposited the proper

quantity of varnish—which should be very limited—upon the exposed point it, should be carefully made to spread over the floor of the cavity with a delicate instrument until all the dentinal tubes leading from the cavity directly to the pulp are covered, in order, as before implied, to cut off all irritation that may cause pain. While the application of varnish is important in order to prevent pain, it should not extend much beyond the “dead-line,” and smear any more of the walls than is necessary ; for in that case it may injure the firmness of the main filling. Having deposited the varnish, it is not necessary to wait for all of the chloroform to evaporate before applying the thin covering of phosphate of zinc, which should be of the consistency of cream, so plastic that, if applied delicately, it can be spread over the entire surface of the varnish without displacing it. The smooth coating of varnish is soothing to the pulp and insulates it, from the cement. Should, however, the varnish coating be injured, pain will generally follow in proportion to the extent of the injury of the insulator. This varnish prevents disintegration of the cement. Having the pulp protected, and the varnish hermetically sealed in by the cement, the chloroform is retained and made useful by acting upon the exposed portion of the pulp beneath ; and the morphine mixed with the wood creosote acting upon that portion of the crown of the pulp which is not exposed, the entire pulp is soon rendered sufficiently insensible to any slight irritation that may take place---a condition tending to obviate any “shock.” Having accomplished the protection of the pulp, a proper additional amount of cement, harder than that used for the flooring, should be introduced, after which, when it is sufficiently hardened, it may be dressed and shaped in readiness to serve as a basis or foundation upon which to build a wart plug. This operation, though applicable to approximal cavities in the front teeth when it is possible to carry it out, is especially valuable to molars acquiring wart-plugs for keeping the jaws apart while “jumping” a tooth, or in operations for correcting protruding teeth where the lower incisors are so long that they bear upon the upper teeth.

SOFT FOIL AND PROGRESSIVE DENTISTRY.

BY E. B. DAVIS, D.D.S., Concord, N.H.

HE thinks soft gold to be a good tooth-saving material. It can be inserted rapidly, condensed solidly, without the use, in many cases of the rubber dam, and will prevent the recurrent decay in a manner that cohesive gold, from defective manipulation, oftentimes fails to do. He thinks that the large number of dentists that learned to use soft gold in a thorough manner, and have discontinued its use, but have used the other forms of gold in connection with it, have been doing an exclusive cohesive foil practice. There are many cases where cohesive foil is preferable and where no other form of gold should be used. And it should be used in cases where it ought to be used. He has filled but very few cavities without using cohesive gold in connection with the soft gold, employing more soft coil than cohesive. By this method contour can be restored as well and more rapidly than by the old cohesive method. Grinding surfaces, and those surfaces to be exposed and highly finished are in all cases to be of cohesive foil.

THE OHIO STATE JOURNAL OF DENTAL SCIENCE.

WHAT SHALL WE DO IN THE CASE?

BY GILBERT H. CORBIN, M.D., D.D.S.

AFTER deprecating the fitting of artificial teeth, which look like "cheap crockery signs," the author urges. Aside from *artistic taste*, correct dentistry demands a *professional* knowledge of health and disease, life and death, the laws governing vitality, physiology, pathology. But men possessing this knowledge, if conscientious, will not permit the occasion for many plates of teeth. Knowledge preserves teeth; ignorance destroys them. Imperfect fillings, and neglect by careless patients, soon destroy natural teeth and call for artificial ones. Timely work and perfect work, and proper care on the part of the patient, will preserve most teeth for a life time. Patients and others whose knowledge of dentistry has been solely derived from observations of the

dentistry of the past, have no just conception of the possibilities in the dentistry of the present. Any firm roots now are far too valuable to be lost, as comfort, usefulness, and durability can be secured by proper treatment and a restoration of their crowns. By most physicians and by many dentists it was long thought that the extraction of any aching tooth was justifiable and desirable, if not imperatively necessary. With such a standard as that on the part of the profession it became an easy matter for incompetent and unscrupulous persons to persuade patients to pay both for the extraction of good teeth and the insertion of very poor substitutes. The credulity that supplies the willing victims not infrequently excites disgust and contempt; and yet the suffering that comes from ignorance generally appeals very successfully to the sympathy of the public. No one will concede the right to extract valuable teeth for the express purpose of supplying poor substitutes; and yet that very thing is being extensively done. At any rate, teeth that are susceptible of being made comfortable and serviceable for a long period of years are being extracted in large numbers and their places supplied by cheap, clumsy substitutes. He asks why is this so? While a few patients are astonishingly persistent in the wrong direction it is a fact that most patients accept the advice of the operator unhesitatingly. Are we not then forced to the conclusion that a portion of the public, by far too large a portion of the public, are being erroneously educated in regard to the desirable and possible extent to which human teeth can be saved? From what source is this erroneous education derived? Who are the instructors? Are they physicians? Are they general surgeons? Are they dental surgeons? Are they dentists of any specialty? The laws of hereditary transmission are now well understood. The offspring is to a large extent stamped with the mental and physical peculiarities of the parents. The violent destruction of any set of organs, persistently repeated through a series of generations, just as certainly and necessarily results in an impaired and imperfect development of those organs, as does daylight follow darkness. The prospective parent who voluntarily and yet unnecessarily parts with the teeth commits a crime toward his or her yet unborn offspring. Good and perfect natural teeth play so important a part in the animal economy, that not even one tooth can be lost without lasting detriment to the whole system. Every organ and every fibre in the body suffer as a consequence.

The question of cause and effect in this field has been so thoroughly studied by the most eminent scholars, as to well-nigh prove the truth of the opinion that on an average human life is shortened one year for each tooth lost.

THE SURVIVAL OF THE UNFIT IN HUMAN DENTITION.

BY DR. J. C. PARKER.

It is probably true that in every broad generalisation there is an element of untruth, or at least, the truth as stated is liable to serious misconstruction, and in no case is this more signally manifested than in the phrase of Herbert Spencer, "The survival of the fittest." Because in its broadest sense the fittest does survive, many have jumped to the conclusion that all that "survives" is the fittest. Fitness may be defined as right relations with environments, and when it becomes apparent that just in proportion as that which survives does not sustain the best conceivable relations with its environment, does not subserve the best possible use, or is faulty in material, form, or growth, just in that proportion the fittest has not survived. It is doubtful if there is in the human organisation any more striking example of the "survival of the unfit" than in human dentition. Given the unlimited resources of nature, the dentist who could not have a better apparatus to conserve and promote the growth, nourishment, comfort, and welfare of the human machine than that presented to him every day in the form and material of the human teeth, would be a bungler, indeed. No matter along what line of development the teeth may have come, there can be no question that, so far as subserving the best interests of that organization that to day stands as the type of the highest in the universe, they are an unmitigated failure. Consider first the unfitness of material that enters into the human teeth; more especially the dentine, composed as it is of an easily separated basic acid, and combined with one of the most readily decomposable of all organic tissues, gelatine, the wonder is that it so long resists the chemical elements that are always present to carry on the work of destruction.

It is true that in the substance and construction of the best varieties of enamel we have one of the most enduring of organic tissues, but its presence in such limited quantities only makes the more apparent the faultiness of all the rest. It might be thought if we had no warning of decay, made manifest by the pain induced by sensitive dentine, we would never heed it ; but experience would be the same teacher then as now, and if we found that our health and comfort was enhanced by the care of, and filling decaying teeth, don't you think we would have it done just as readily then as now? Let us also consider the growth and eruption of the teeth. Has any one ever discovered any intelligent use or excuse for the deciduous teeth? Why not deciduous fingers, ears, and noses as well? A few small insignificant teeth causing oftentimes great distress, and even death in their formation and eruption through the gums, and when once in place subject to sudden and rapid decay with all its attendant evils. And when at length absorption occurs and the permanent teeth take their place, we often find that nature has blundered again in not making the jaw large enough, and we have presented to us those frightful irregularities that are the agony of patient and friend, and the despair of the dentist.

THE DENTAL REVIEW.

GUM-COLOURED PORCELAIN FILLINGS.

DR. A. H. THOMPSON, of Topeka, Kan.,

THE theory of porcelain settings or inlays, for filling cavities on the anterior, visible surfaces of the teeth, has been again revived and has attracted considerable attention. There is no doubt but that porcelain possesses the most favourable qualities for imitating the natural enamel in colours and texture, of any material with which we are acquainted. We constantly employ it in the imitation of the natural teeth with the greatest success and the most complete deception in restoring whole crowns, and it really seems that we should be able to use it with equal success in the restoration of parts of crowns. This is singularly difficult, however, for it is very refractory as a filling material. The greatest difficulty to be overcome

is to make a joint with the enamel that will not be easily noticed ; but this must be accomplished before we can employ the material successfully as an invisible filling. Porcelain setting or inlay in human enamel is closely related to the arts known as inlaying and mosaic. Inlaying is the art of filling up incised designs with a material different from the base or matrix, whether metal, wood or stone, and then finishing off and polishing all together. Mosaic is the fitting together of many pieces of coloured marble, enamel, glass, etc., to form a pattern and by grinding off the ends of the rods, a picture in imperishable colours is displayed. A combination of the two is called inlaid-mosaic. Our porcelain dental inlay-work is most closely related to the ivory inlay mosaic art, the technique of which the writer commends to be studied. Cloisonné work is made by leaving a partition or cloison of the basis material between the inlays, such as the old ivory cloisonné mosaics, or the network metal pieces. In the latter, the porcelain or enamel is baked in the cells of metal in a pattern, and the whole polished off together, leaving the metal exposed in the lines of the design. Such an effect is produced by setting a piece of porcelain with gold in a tooth, as it is separated from the basis of the enamel by a cloison of gold. One branch commends itself to the author. It is that of filling cavities on the exposed surfaces of the necks and roots of the anterior teeth above the enamel, in the region usually covered by the gum, by setting in inlays of red or gum-coloured porcelain taken from porcelain gum teeth. Gold fillings on the necks and roots of teeth are very unsightly and offensive, and anything that will enable us to avoid such a misfortune to our sensitive patients will be a boon indeed. It is especially serious with ladies, some of whom by too vigorous cross brushing have caused the gums to recede over the necks of the anterior teeth, thereby leading to caries in that situation. Of course the number of cases in which this art is applicable, are comparatively few—scarcely enough, in fact, to develop a passable skill. But with careful effort, the operation can be performed very nicely by the ordinary practitioner, and the pleasure of seeing the appearance of gum restored where an ugly carious spot or a gold filling existed before, is a reward for the tedious labour expended in its execution. The technique of this branch of the work is very simple. A piece of porcelain gum from an artificial tooth

is selected that matches the natural gum in colour and texture as closely as possible, there being some variety in the colour of the gum in different persons. But, as the cement used in setting the piece is coloured also, you can control the shade to a great extent by the amount of colour employed. To colour the cement, a very little dry Chinese vermilion, tinged with ultramarine blue, is first mixed with the oxide powder to make the cement blueish, for setting the piece, as the pink cement furnished us will not answer for this purpose. The piece of porcelain gum selected is ground to proper thinness from the tooth-body side, making allowance for the projection of the piece from the cavity to some extent, in order to restore the fullness of the gum. The cavity must be cut as deeply as safety will permit and laterally to the gum margin, or under the gum if possible, in order to make a good joint. Large cavities running up on the root, unless quite narrow, will require two pieces to fill properly, which are fitted together at an angle in the centre, like the comb of a roof. The margins of the cavity must be undercut and the thin edges of the pieces slipped into the undercuts. This should always be done when two pieces are used. When there is a mere crescent of decay at the margin of the enamel, the piece requires delicate fitting, and if the crescent is very extended the cavity can best be filled with two pieces. Large cavities including portions of both crown enamel and neck can be filled with a combination piece of artificial tooth including crown and gum. The inlays are very carefully ground, being fitted in the cavity from time to time and being examined with a magnifying glass. Care must be taken to preserve the contour of the tooth, or the margins and long ends of the piece will not lie closely. When the piece becomes too small or too delicate to hold in the fingers, it can be set in shellac on the end of a piece of soft wood, and ground safely. The shellac is easily softened in the lamp flame to change the position of the piece, or to try it in the cavity. For very large cavities to save time take an impression of the cavity and have the piece roughly fitted to a model in the laboratory. When the piece is properly fitted in the cavity, it is set in the coloured cement, and after this has hardened the whole is carefully ground. The inlay is allowed to project in a rounded eminence from the cavity, in order to, in a measure, restore the contour of the gum. The effect of this simple operation is surprising,—the deception being complete,

or the artificial gum piece seems continuous with the natural, gum when moistened, and the great advantage over gold from an artistic standpoint, is at once apparent.

COPPER AMALGAM.

By L. VANDERPANT, L.D.S., (Ont.)

COPPER amalgam is, if not the oldest, yet one of the earliest of plastic stoppings used by English dentists, and was known to them as "*Sullivan's Cement*." It was reduced to a plastic condition by placing a sufficient quantity in a common iron table spoon which had been heated to something less than red, when in about half a minute globules of mercury uniformly appeared, and it was worked to a suitable consistence with a pestle and mortar, at the same time washing with, first, acidulated water (acid sulph 1 in 50), subsequently in clean warm water till all trace of acid is lost. (An alkali appears to deteriorate the material.) The chief points to regard are the avoidance of bringing the material in actual contact with fire or flame, and thorough washing in the mortar. For this, as well as any other amalgam, a very useful instrument is a "plugger," whose working surface has been amply *tinned*. It not only readily takes up the material from the stand, but in process of insertion can be made to take up an excess of mercury. A common spoon from which the tin has been burnt off, is, with the alcohol lamp, the simplest means of softening the copper amalgam chunks. A German silver one is equally appropriate for gutta-percha. He advises to procure a very fine precipitate of metallic copper, from its sulphate (or blue vitriol of commerce), and combine in a pestle and mortar, under continued streams of boiling water, with a sufficiency of bi-sulphate of mercury, until amalgamation occurs. The addition of a few drops of acid sulph. expedites the process. Thorough washing is a *sine qua non*. Admitting the objection of colour which varies in certain mouths from jet black to lavender or gray, he thinks no one from conscientious scruple or dread, who would use *any* amalgam, need hesitate about a copper one, and that as a means of preservation it will eventually rank higher than any we at present possess. Nor is there any objection to giving a coating with some of the alloys containing zinc, which *do* maintain a respectable colour, but are disreputable in other essential particulars.

SOUTHERN CALIFORNIA PRACTITIONER.

DENTAL IRREGULARITIES OF THE NATIVE RACES.

BY E. L. TOWNSEND, D.D.S., Los Angeles, Cal.

THE writer asks : " Are there any influences connected with civilisation that are productive of the degeneracy of the dental system. Is civilisation to be charged with the frequent anomalies to be met with in the civilised man? Is decay of the teeth peculiar to civilisation? To answer these questions we must determine whether the dental systems of uncivilised races of men are free from anomalies and all those diseases and malformations of the oral cavity so common to the civilized. If we refer these questions to the general practitioner, says Dr. Patrick, of either medicine or dentistry, the answer will be that the savage is exempt from these diseases and malformations, and that civilised man, owing to his artificial mode of living, requires artificial methods to support his organism : that while his mental capacity has increased, it has been at the expense of his physical. When asked for proof of these statements we are met with generalities ; statistics sometimes are quoted, but only from the side of civilisation. Now, seeing that the savage has no asylums to investigate, no physicians or dentists to interrogate, that we could recognize as reliable, and no statistics to question, the conclusions drawn are quite *natural*, and being natural, are one-sided and very savage, but certainly not scientific." It seems to be generally accepted, that the uncivilised and semi-civilised races are exempt from those dental ills which create so much discomfiture to civilised man : that dental caries was but seldom found, and malformation a thing unknown. If we had the percentage of dental anomalies found in the excavations, it would prove fully that the uncivilised man was subject to all the forms of dental irregularity that are found in the civilised races. The savage, as he exists to-day, presents all the dental trouble found in his civilised brother. The writer has seen the stoical Sioux suffering the tortures of an ulcerated tooth, and his demeanour was much the same as would be a white man's under similar circumstances ; and he thinks that if an examination should be made of the various Sioux on their various reservations,

not fifty per cent. of the adults would be found free from caries, and at least five per cent. would show irregularity of position; and these irregularities would present the same features as those found in civilised mouths. Examination of the reservation Sioux, both in Minnesota and Dakota, and of the Klamuth Indians of Oregon shows that they have decayed teeth, and dental irregularities are more common among them than any others, excepting the Pueblos of New Mexico. One old fellow who was eternally lounging around Fort Klamuth had a protruding under jaw, and having lost his back teeth the front ones had become abraded until the lower teeth passed the upper like a pair of shears, and presented an appalling appearance. Many had protruding or V-shaped arches, but most of the irregularities consisted of the malposition of one or two teeth. The Indian agent of the Klamuth reservation states that the Indians suffer from toothache and many other aches similar to the whites, and he said furthermore, that the females are not blessed in the way generally supposed, but that in many cases their children are born with as much pain and labour as come to the lot of civilised women. Many die, and only the more robust succeed in bearing a respectable sized family. The children, owing to the unprotected manner of life, fall victims to various diseases, and only the best of them succeed in reaching adult age. This accounts for the physical development of those we see. The present generation is stated not to be as tough as the preceding. This is a fact. They are the picked men of a picked crowd. In '49 it was no small undertaking to cross the plains; none but the best undertook it, and before the trip was ended they had been sorted time and again, until those who were left represented the best men, picked from the best and toughest race of men produced in this century; men bred and cradled under those influences best calculated to produce bone and muscle. So it is with the Indian; the living denote the best; the weaker have succumbed. The reservation children show all the ills and deformities of civilised children. Whether this is because of the degenerating influences of civilisation, or warmer houses and Government rations, is a matter yet to be determined; and all investigation of the Indian, relative to his dental equipment, will be hampered by the fact that those most likely to show deformity are buried and those in the most perfect state are to be found. The Pueblo Indians of New Mexico present at the present time the

best opportunity for investigation of any of the Indian races. Their mode of life and habits tend to make them of especial interest to the dental student. They live in small villages or pueblos, and are to a limited degree agricultural. The squaws grind their grain between two stones and "lose none of the best of the grain," and the only effect on their teeth seems to be the excessive abrading of the crowns. The extra phosphates do not compensate for the extra grit in the flour ; consequently the enamel wears away, the teeth become sensitive (just as sensitive as white men's teeth when abraded, if an Indian can feel as much), and hardly can an elderly Indian be found who does not know the pangs of an aching tooth. Carious teeth are not uncommon and irregular teeth are frequently met with. He places the percentage at fifteen or twenty. Dr. F. M. Palmer has made extensive explorations of the Rancherees on the islands off the coast, and has succeeded in making a very valuable collection of Indian relics, in fact one of the most complete in Southern California. He has resurrected upward of three thousand burials and has found several interesting specimens of dental deformity. He states that in fully fifty per cent. the teeth came together in direct antagonism ; this appearance is undoubtedly due to the excessive abrasion occasioned by their mode of living. On his last trip he secured a very interesting specimen which shows conclusively that the same conditions existing in an uncivilised mouth will produce the same results as though the owner was civilised.

ARCHIVES OF DENTISTRY.

THE USE OF A MOUTH MIRROR.

By DR. B. Q. STEVENS, Hannibal, Mo.

THE writer considers the mouth mirror is not sufficiently used. We should educate our eyes and hands so we can work just as accurately and delicately by looking in the mouth mirror, as if we were looking straight into the cavity. We should be able to use the finest broach in the most delicate place, and manipulate our gold as firmly against the walls of the cavity. It is a little difficult to learn, and will take some time before it will come as natural as to look straight at your work ; but you can all learn. Among other advantages is

the fact that its use permits the dentist to sit at his work and so save much fatigue. There are many corners and curves in a majority of cavities that it is impossible to see without the use of a mirror, but easy enough with one. Now, when you go to operate with this view, everything has to be done in an entirely opposite way, which is very awkward at first, but can soon be overcome. He recommends to have three good mouth mirrors on the operating bracket; one plain, and two different grades of magnifiers, so that when you want a better view, you can take up another glass and so magnify your work to suit your eyes. Sit on your stool or stand perfectly straight, with your body as close to your patient as possible and your head as far away; have your patient lower than yourself, and keep your mouth close while operating. It is scarcely ever necessary to stand; even the anterior proximal cavities in bicuspid and molars can be prepared and filled more easily by looking into the mirror, as you are not in your own light or in the way of your assistant.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

QUERIES ON NITROUS OXIDE.

To the Editor of the British Journal of Dental Science.

SIR,—Will you allow me a small space to ask a few questions respecting a paper that appears in the Journal of the 16th Sept. "Notes on Nitrous Oxide Gas."

The author we see is J. Ottley Atkinson, and I find on looking in the Dental Register, he resides at Kendal, and my guide returns the population of that town at 12,000. Is there man or woman in Kendal with a good or bad set of natural teeth? Let me quote what he says:—"In 1871, I began repeatedly extracting over a dozen teeth and roots of teeth, and in one favourable case, eighteen were successfully removed during one inhalation of Gas." An expert extractor will frequently succeed in clearing either upper or lower jaw at one administration." An American, he tells us, accomplishes this daily. The author also tells us that he has frequently seen this done, and in one instance he saw 24 teeth extracted out of one head and at the same time.

Now, what I would like to ask this conservative dentist is, What were the 24 removed for? I never saw occasion to resort to such edentulation. Who has seen the necessity for clearing an entire upper or lower jaw? Yet this is a daily occurrence in Philadelphia. To clear a jaw with a few teeth and roots is only an every-day occurrence, but how are the whole 12 teeth pulled out, and in another case the whole 24.

Margate.

Yours, &c.,

APPLEBY KING.

British Journal of Dental Science.

No. 522. LONDON, OCT. 15th, 1889. VOL. XXXII

THE ELECTRIC LIGHT AS A MEANS OF DIAGNOSIS IN EMPYEMA OF THE ANTRUM.

BY THEODORE HERYUG, Director of the Laryngological Section of St. Rochus Hospital, in Warsaw.

“THE diagnosis of diseased conditions of the antrum of Highmore, more especially of accumulations of pus, has hitherto been very difficult in the majority of cases. Every observer must have met instances in which he was long in doubt as to the diagnosis, and judging from my present experience I must acknowledge that I may often have failed to diagnose cases of empyema.”

With these words so boldly expressed Moritz Schmidt begins his paper on the diagnosis and treatment of affections of the antrum. I fully agree with every word of this statement. In former days I was often in doubt as to whether I was dealing with a case of disease of the antrum or of the sphenoidal sinus, and I scarcely find twelve cases entered in my medical journal since 1874, as positive examples of empyema of the antrum. Within the last six months I have collected ten cases of the kind, in each of which a positive diagnosis has been arrived at by the use of the electric light.

As early as 1882, Hartmann published valuable examples of diseases of the neighbouring cavities, and explained the relation of supra-orbital neuralgia, the influence of the hindrance to the flow of secretions from the middle nasal meatus; he also ascertained the full importance of Politzer's method of compressing the air in the nose and its value as a method of diagnosis. In a later publication in Freiburg, Hartmann explained his method of washing out the antrum through the maxilla by means of an appropriate canula. In this way he had been able to effect a cure in cases which had proved

rebellious to every other form of treatment. A host of publications on the same subject followed in rapid succession. The fact of so little importance having been attached to them must, as Krieg remarks, be ascribed to the value which the old classical symptoms, namely, expansion of the antrum, increased flow on lying on the opposite side, pain in the infraorbital region, inflammatory swelling of the soft parts of the cheek, are still supposed to possess. Ziem deserves the full credit of having shown that with the exception of the frequent recurrence of pain, these symptoms do not necessarily belong to empyema, but may also occur with cysts and new growths. He, it was also, who first drew attention to the importance of sundry symptoms which had hitherto been overlooked, such as the unilateral and periodical character of the purulent flow. The diagnosis, however, still remains a matter of difficulty in many cases, notwithstanding the use of the plan first recommended by Bayer and then by Fränkel of making the patient lie on his stomach with his head overhanging.

The exploratory puncture or aspiration of the antrum may certainly be looked upon as an important step in advance in the diagnosis of empyema. It demands, however, special manœuvres, and may be attended with great difficulty if the osseous walls be at all thickened, as in the cases of asymmetrical development of the antrum, or in cases of special deformities of the lower nasal passage. If the cavity of the antrum is very much deepened and it contains but a small quantity of thick flaky pus, it will not always be easy to aspirate because the canula is very apt to get blocked. Though, personally, I am quite certain that this slight operation is unattended with risk of any kind, there can be no question that many patients would shrink from it and refuse to submit to it.

Under these circumstances it was very desirable to have some painless method of diagnosis. Such a one is to be found in the method quite recently introduced by Voltolini, *i.e.*, of translucent lighting. I have tried the method in ten cases and can fully recommend it, and on the 19th of February I gave a demonstration of the process at a meeting of the Medical Society of Warsaw.

The merit of having introduced this method of diagnosis unquestionably belongs to Voltolini, who has thus improved upon Czermak's idea of transillumination of the larynx. He hit upon the plan of using one of Edison's incandescent lamps

instead of direct sunlight, and at once tried the process for the illumination of the nose, the palate, and the antrum.

In a paper read at Breslau, last year, Voltolini gave an account of the diagnostic value of the method of transillumination, and showed the instruments he had devised for the purpose.

Very few observers have hitherto shared his views on the subject and even now it is very likely to meet with a deal of opposition. Gerhard and Störk both acknowledged that the process could be carried out, while Semeleder went so far as to deny even this. Fürck makes no mention of it. Schrötter in his recent work calls it elegant child's play.

Hardly anyone has hitherto given the method a practical trial.

Voltolini expresses himself as follows concerning the illumination of the antrum. "The facial bones can also be seen through by means of a small incandescent lamp. For this purpose I place the lamp in the patient's mouth, taking care, however, to wrap up the metallic parts with a towel so as to prevent the patient feeling an electric shock if he touches it with his lips. If the lamp is now lighted the whole of the face as far as the orbits becomes translucent."

In the appendix to his work on diseases of the nose (1888) Voltolini, says: "This method of translucent illumination may also be of great service in cases of tumours of the antrum. As I am writing this a very unusual case presents itself to my mind and I think I cannot do better than to relate it."

"A young man, aged 22, had been suffering for some years with a tumour of the left side of the jaw which went on increasing, and had come to form a visible swelling in the nasal cavity. The whole of the left side of the hard palate was pushed forward almost to the opening of the mouth. It felt moveable and could be pressed upwards. Voltolini diagnosed the case as one of sarcoma and advised the patient to submit to resection of the upper maxilla. As the patient would not consent to this Voltolini decided to destroy the tumour by means of electrolysis. But before doing so he tried illumination of the jaw and was not a little surprised when he found that the whole of the tumour, which could be seen in the nose was perfectly translucent.

Voltolini thus expresses himself: "I must honestly confess that I did not know what to make of this, for I had not the

slightest doubt that I was dealing with a sarcoma which had arisen from some parts of the antrum and distended the walls, and that it had finally broken into the nasal cavity.

He now took an electrical fork and thrust it into the tumour and sent a powerful current through it for about five minutes. The next morning he found that the place where the fork had been had given way ; that an enormous quantity of fluid had come away from the nose, and that a large hole existed through which it was easy to see into the antrum and to pass a probe into it.

"The diagnosis was now clear. We had to deal, "says Voltolini," with an empyema or cyst of the antrum of Highmore, for after the evacuation of the pus and serous fluid the cavity was quite empty. The tumour in the nose was nothing else but the inferior turbinated bone, which had been thrust forward with the remaining portions of the walls of the antrum. It was quite clear now why the illumination of the tumour had been so very brilliant for the light passed through fluid. Now that the antrum is empty, if I light the lamp in the patient's mouth, anyone can see even at a distance how far better the diseased side is illuminated than the sound one, for the left widely expanded antrum now formed a large cavity filled with air which transmitted the light far better than the small antrum on the right side. The use of this form of illumination is likely to prove of great value in the future for the diagnosis of cases of empyema and tumours of the antrum."

I have quoted the very words of the last passage, because I believe that Voltolini has not laid sufficient stress on the most important symptom of empyema, namely the fact of the diseased side remaining dark throughout the illumination, and also because he appears to mix up the symptoms of empyema with those of cysts which are quite different.

Speaking from my clinical experience I may state that while in cases of serous cysts of the antrum, both sides become illuminated (the expanded side more so than the other), on the other hand in empyema the affected side remains dark, whereas the healthy one appears red as far as the orbit, and towards the lower lid we find a brilliant sickle-shaped clear red segment reaching as far as the inner angle of the eye. This symptom is to be looked upon as a positive sign of empyema except in a few exceptional cases which I will mention by-and-by, and was present in every one of my patients,

so that in difficult cases it will settle the matter even in the absence of other signs which are erroneously supposed to be necessary signs of empyema.

I will now describe the method of examination as I have used it up to the present.

For the purpose of illumination I use an electric spatula as made by Reiniger in Erlangen. This has, as is well known, the shape of Türck's tongue depressor.

The small india-rubber plate can be easily removed and a small Edison's (5 volt) incandescent lamp screwed on. With a proper battery this will give a clear white light, and in a well darkened room, to which point, I set the greatest importance, this is quite sufficient to obtain a powerful illumination of the cheeks and maxillary sinuses.

If the illumination is attempted with weaker currents and with lamps of two to four volts, and in an imperfectly darkened room the result will be uncertain and incomplete.

The battery (I make use of one specially constructed by Leiter for electric lamps, which consists of ten carbon and zinc cells, and obtains its motive power from a solution of chromic acid and dilute sulphuric acid) should be freshly filled and six cells will then be found to be quite sufficient for Reiniger's depressor, even when they are dipped to only a quarter of their length. It is most important first to close the contact on the electric depressor, and then to dip the elements into the fluid, otherwise the filaments will almost certainly be burnt through, this will be seen at once by the lamps going out, the elements must be lowered very slowly and gradually unless the current be weakened through a rheostat.

As soon as the filament becomes red the elements may further be lowered until a white light be obtained, but the tongue depressor must be placed in the mouth immediately. If too long a time is allowed to elapse the current in the battery increases too rapidly and the filaments in the lamp may be burnt.

The tongue must be firmly pushed down, and depressed, the mouth closed and then contact should be made. The whole of the bony structures of the face as far as the orbit at once become illuminated equally so on both sides under normal circumstances; but if there be anything wrong with either antrum such as ectasis, atrophy or any diseased state, the difference is at once apparent.

I have already remarked that in cases of cysts containing a

serous fluid the light is transmitted very freely, but in solid growths or empyema the affected side remains dark. In cases of double empyema both antra will of course remain dark, but in such cases other symptoms, such as bi-lateral discharge will most likely also be present. I have not as yet been able to detect a single case of double empyema among those that have fallen under my notice.

When the examination is over if it has taken any time, the lamp should be left in the mouth for a quarter to half a minute so that it may cool down somewhat, and so as to avoid burning the patient's lips or palate. After a little practice this will be easily avoided.

Before introducing the lamp into the mouth and trying its power of illumination I light a wax match, then I put the depressor on the tongue, and send the electric current through the lamp. If the patient has a small mouth I make him practice once or twice and forbid him to swallow so as to avoid burning the palate. In one case only did I find the bones so thick that it was impossible to light them up. In all the others it was easy to do so, and without any inconvenience to the patient.

Eight or ten cells of a Stohrer's constant current battery will give a sufficient light, while twelve to fourteen cells will raise Blainsford's diaphanoscope to a white heat. Reiniger's spatula often fails when in use as the contact surfaces easily get oxidised. I have had mine coated with a thin sheet of platinum and now it never disappoints me.

After these introductory remarks on the method of carrying out the process I will now shortly prove its value in cases of empyema of the antrum of Highmore by means of clinical observations.

In ten cases, as I said before, I was able to diagnose positively the presence of pus, but in seven of these only was an opening made and pus let out.

Of these seven patients five were men and two women, whose ages varied between 15 and 55.

The average duration of the illness was over two years. The right side was affected in five cases and the left in two. As regards etiology in every one of them some of the upper molars or bicuspidis were diseased, either decayed or absent, small pieces of diseased fangs alone remaining. My experience confirms that of Krieg that the first molar or second

premolar are usually the starting point of empyema of the antrum. I find that with a little practice it is very easy to probe the maxillary bone after using cocaine and in the majority of cases without causing the patient any pain. The probe I use is an ordinary thin one provided with a knob, and bent at a right angle, the short arm of which must be about 8mm. long. It is introduced by means of Duplay's speculum for a distance of about two inches into the middle nasal meatus with the beak looking down. It is then rotated slightly towards the outer wall and gently drawn forward and inserted sideways into the ostium. If it finds the opening it gets hooked in.

It is easy to measure the size of the opening by gently moving the probe backwards and forwards. As a rule it is about three to four millim. wide. In one case only—one of ectasis of the antrum with swelling of the cheek—I found it impossible to introduce the probe. In this case Dr. Zawdyuski made an opening into the antrum from the canine fossa by means of a chisel and hammer, and through this I was able to introduce my finger and detect the presence of osteomata in the shape of leaflike lamellæ. These were removed, the antrum cleared of its serous and purulent contents, a small lamp was then introduced into the cavity which was found to be dilated to an enormous size.

It measured 5 cm. from side to side 6 cm. from before back, while the opposite side was very much smaller. After opening the maxillary bone from the canine fossa, and forcing a probe through the thickened mucous covering the cavity was thoroughly syringed out and the fluid came away through the nose. A tampon of iodofomed gauze was inserted together with a drainage tube and in a fortnight a cure was obtained. In another case I was able, contrary to the opinion arrived at by Roth by deduction, to introduce a small lamp into the antrum through an opening made in the alveolus with a large trochar and to light up the whole cavity. I repeated this experiment at a meeting of the Medical Society of Warsaw. The ostium maxillare may often be displaced in a very short time by the swelling of the mucous membrane of the middle nasal meatus and turbinated bones, and in such cases the passage of a probe will be attended with more difficulty for a time, in some cases it will be rendered quite impossible for some days. This is a point which should not be lost sight of. I met with these symptoms in the case of a

lady in whom I thought of widening the passage by means of the galvano-cautery. After washing out and disinfecting the antrum I first thrust the instrument in a horizontal direction and burnt a slit about 1 centm. long, and from one end of this I brought the cautery downwards as far as possible so as to facilitate the flow of pus. The result of this operation was anything but satisfactory, and I had to resort to Cooper's method, *i.e.*, of extracting the second bicuspid, before I could obtain a cure.

In some cases, I have tried washing out the cavity with a catheter bent in the same way as the probe described above, but in those cases only in which the opening was wide enough to admit of the passage of the fluid by the side of the catheter. Twice I have succeeded in passing the probe through the alveolus of an extracted tooth and thrusting the end of it through the opening into the middle nasal passage.

As regards etiology I have only met with one instance in which I thought the disease could have been caused by the extension of a catarrhal process in the nose. The patient had sound teeth, in the nose close to the meatus there were mucous polypi. The affection had evidently started with a violent cold in the head.

In a second case the diseased conditions were of a more complex nature still. In addition to the nasal polypi and the empyema of the antrum, I also found the sphenoidal sinus diseased, and, notwithstanding repeated washings, on pressing with the thumb pus kept welling up in the neighbourhood of the opening—close to the posterior end of the middle turbinated body. After the removal of the hypertrophied end of the concha another mass of small polypi could be seen above. The flow of pus decreased after their removal and was cured by injections. This was the fourth case of pus collection in the sphenoidal sinus which has come under my notice.

In two of the cases the pus which flowed from the ostium after the antrum had been syringed in the morning, had a most offensive smell. On examining the nose I found in each of these cases more or less chronic swelling of the turbinated bodies more of the inferior than the upper. The secretion could usually be seen at the morning examination to adhere to the middle concha and to hang from this in the form of white strings or of a greenish sticky mass.

The above described case was only one in which there was

very great dilatation of the cavity, in four others the canine fossa was the seat of a slight swelling. Four of my patients complained of pains in the teeth and face, two of supraorbital neuralgia, one of violent suffering between the eyebrows, and another of periodically recurring pain in the face and back of the head, which commenced as a rule about midday. In this case, however, pressure with the probe showed that there was pus in the sphenoidal sinus in addition to the disease in the antrum. These symptoms disappeared after the removal of the fore portion of the lower turbinated body and of some small polypi hanging from the roof of the nose.

Four patients complained of toothache, and in one of those all the back teeth had been removed, Violent pain in the eyes in one instance and *muscæ volitantes* in another were the chief symptoms complained of. In all cases the sense of smell was impaired, in two it was altogether lost. A profuse unilateral discharge was the only symptom in one case. The second bicuspid was, however, removed, the probe entered the cavity at once and pus came away. These in the absence of all the usual symptoms, the diagnosis was settled by means of the illumination.

With regard to treatment, in one case only was Desault's called for, in all the other cases Dr. Zawdyuski was able to perforate through the socket after the extraction of a tooth or fang, or even through the toothless jaw by means of a trochar about 5 mm. thick. A short silver tube about 2 centim. long and 5 mm. in diameter provided with a flat plate was then introduced and fastened by means of silver wire to the two neighbouring teeth. I find a longer tube unpractical because if the secretion be scanty the end of the tube is above the level of the fluid. In order to avoid the entrance of food, I place a piece of india-rubber tubing about 1 centm. long on the end of the canula, this is made so as to act as a valve and when pressed upon closes the opening of the canula, but on the other hand it does not prevent the fluid from running out, or hinder the passage of the catheter for the purpose of washing out the cavity. The tube is left for from eight to twelve days in the fistula, and the nose is syringed out three times a day with a five per cent. solution of boric acid to which a small quantity of weak solution of carbolic acid has been added until the solution returns perfectly clear and the tubes are left in until the patient learns to thoroughly wash out the antrum for himself.

In two cases iodol was blown into the cavity of the antrum and with good effect. A cure was obtained in five cases out of the seven, in one there was a relapse after four weeks. One patient is still under treatment.

Mikulicz's operation could only be performed in one case, and then only after the removal by means of Schoety's knife (for cutting from behind forwards,) of an obstructive mass of cartilage springing from the septum. The result even here was unsatisfactory and an opening had to be made later on through the alveolus. I have also tried to make an opening in the lateral wall of the antrum from the lower nasal meatus by means of the galvanic cautery. I found it impossible to use Krause's trochar in any of my cases owing to the swelling and narrowing of the lower nasal meatus. All my attempts to enlarge the ostium maxillare by means of the electric spoon proved very painful and as yet have been most unsuccessful. I intend in the next case to make a trial of Mikulicz's method of opening the antrum through the lower nasal passage by means of a bistouri caché. For the present it will be enough for me to say that the illumination of the antrum can be carried out with the greatest ease and that in the majority of cases it looked upon as the most conclusive sign of empyema.

IMPROVED METHOD OF INSERTING ARTIFICIAL TEETH.

By H. A. PARR, D.D.S., Demonstrator in the Baltimore College.

THE increased requirement for, and the greater appreciation of dentistry by all classes at the present day, compared even with the last generation, have caused dentistry to develop into an important art, and rank as a Science, while those who practice it, form a prominent profession. In improved methods and inventions, dentistry has extended its sphere of usefulness so much that at present its possibilities seem unlimited. Instead of the ruthless extraction of the natural teeth, so much encouraged by the introduction, and the reckless use of nitrous oxide gas, their true value are recognised,

and the means of their preservation better understood. Not alone in regard to the preservation of each individual tooth, does this hold good, but also in the facilities which even a portion of the natural teeth afford for the artificial replacement of absent ones by improved methods termed Bridge-Work.

This branch of the dentist's art, consists in the artificial replacement of the loss of a portion of the natural teeth, by bridging the vacant spaces with substitutes which are supported by means of this attachment to the adjoining natural teeth without the use of a plate. The natural teeth, forming the supports, are capped or crowned roots, but badly decayed teeth are equally serviceable for the purpose. Artificial teeth inserted by this method are fastened in the mouth as firmly as the natural teeth to which they are attached. This is a great advantage in speaking, vocalization, and in mastication. Bridge-work as now made is immovably inserted in the mouth, and cannot for any ordinary purpose be removed, even to occasionally thoroughly cleanse it. In a case of needed repair, or some pathological condition demanding the removal of the bridge, it can be done at great trouble and expense.

The present invention overcomes this, the only objectionable feature of Bridge-work.

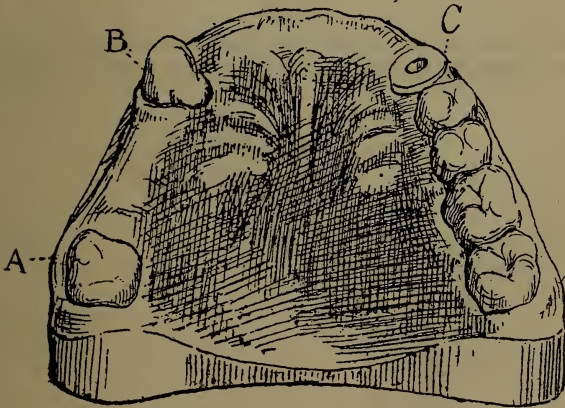


Fig. 1.

The model represented in Fig. 1, will serve as a typical case to illustrate the application of this invention.

It will be seen that the posterior teeth are all present on the left side, and all absent on the right side, except the second molar (A) In the front, the four incisors are absent. The Cuspid (B) on the right, and the Cuspid root (C) on the left are utilised to support and retain the teeth forming the Bridge-work to replace natural ones which are absent. The teeth A and B are first telescoped, with caps of gold accurately adapted to the respective form of each tooth. The gold being removed



Fig. 2.

in such a manner as to fully expose the front surface of the cuspid. The Cuspid tooth (C) is crowned with a gold crown



Fig. 3.

faced with porcelain to represent the front of the natural tooth. The teeth and the root, so crowned, are shown

in Fig. 2. The Bridge-work replacing the absent teeth between the crowns, is then made as illustrated in Fig. 3, and seen in position in Fig. 4, being firmly secured when in position to the crowns by the peculiar spring attachment, one portion of which is seen on the side of the crowns, and the other on the ends of the bridge in Fig. 2. A post fitting into a tube on the crown (B) acts as an intermediate support.



Fig. 4.

The construction of the attachment in detail is illustrated in Fig. 5. In this case, the socket section of the attachment is projecting from the side of a molar crown. The other



Fig. 5.



Fig. 6.

section, which is the part connected with the bridge, consists of a cap having a spring flange. The spring flange is made of two pieces of plate, one a little larger than the other, con-

nected at the edge as they enter the socket; the short piece of gold (A) forming the flange is bent a little outward to give the desired tightness. A portion of the sides of the cap is left open at B, and bent toward the flange, and will also give additional hold.

The present invention secures to the wearer all the advantage of permanently attached Bridge-work. and at the same time permits removal with the same facility as obtains in the case of artificial teeth inserted on a plate. Fig. 6 which gives a front view, shows the parts in appearance perfectly restored. From two to fourteen teeth can be inserted by this method.

MEXICAN DENTAL PATIENTS—THEIR WHIMS AND FANCIES.

By VIAGERO.

A FEW peculiar ideas which the Mexicans have on the subject of Dentistry will be found in the following notes. Some of these ideas are not confined to those living far distant from railroads but are held by many in the capital and larger cities of the Mexican Republic.

Many fear that the artificial substitutes we insert are natural teeth, and even after a minute examination and explanation they cannot be persuaded to have them inserted until they know positively who the former owner was, and are assured that he did not die of an infectious disease.

In remote towns seldom visited by dentists, Mexicans will insist on having discoloured yet perfectly sound teeth extracted, before the visiting dentist departs, on the plea that these teeth *may* ache when there is no dentist at hand.

The Mexican will frequently draw from his vest pocket two or three teeth kicked out by a horse several years ago, and enquire the cost of having them re-set.

The Mexican will always bargain hard for a reduction in your fee, and I have had offered me pistols, cigars, watches, scarf-pins, sombreros, mules in exchange, and in one instance *a young girl* was suggested by her mother as part payment of an account.

Some Mexicans never pay, others think it very hard to part with their money after receiving the work, so unless the dentist desires to work for nothing he must secure a deposit in advance, and the balance when the operation is concluded.

Two months ago I extracted a molar for a young lady who was accompanied by her mother, and as they were leaving without producing the usual fee, I asked for it. "What?" exclaimed the old lady in great surprise, "Why! we have no money!" I afterwards learned that this family owned one of the largest business concerns in town and was exceptionally well off.

Another old woman (I forgive her on account of poverty), after the extraction, asked "Well, doctor, how much do I owe you?" "One dollar," I answered. "God will pay you two," replied the old lady as she vanished in the door-way. These two dollars have not as yet been paid.

A foreign dentist on entering a strange town, as a rule is generally well-received, a Britisher in preference to an American, if his work gives satisfaction, if he praises the country and flatters its people, if he has "nerve" enough to state that he has a mind to become a Mexican citizen, he will get all the practice in the place, no matter should there be a dozen Mexican dentists in the same town, but should he lose his temper (which is sometimes hard to keep) and fail to humour his patient, the latter will consider himself insulted, and for a foreigner to insult one man (especially in a small town) is equal to insulting the entire population. Should this take place the best thing for the dentist to do is (as they say in New York "to make himself scarce," or in other words, pack up and "get."

In Mexico, the dentist is frequently called upon to visit patients; he is politely received, and the master of the house tells him, "My house is yours, sir," he then introduces him to his wife and family, stating that they are his (the dentist's) also.

The dentist has come to extract a tooth for the lady of the house, she is pale and trembling, her features bear what might be called a corpse-like appearance on account of the clumsy manner in which she has daubed her face with chalk, a universal custom amongst Mexican ladies.

She has prayed, and is now surrounded by her family, her husband lovingly embraces her apparently for the last time, then takes up his position behind the chair and gently places

her head upon his breast, the children (generally ten or twelve in number) begin to cry and crowd around their mother, the dentist elbows his way to the chair and removes a small root hanging loosely to the gum, the patient moans, her eyes close, the husband looks anxious, the children cry louder, now and then casting their revengeful little black eyes upon the dentist, servants rush around in wild confusion, carrying towels, water, wash-hand basins, &c., at last the patient opens her eyes and is again embraced by the husband who hands her over to the maid-servant, and that worthy person gently leads her tottering mistress off to bed, the dentist then receives his fee and retires, the master of the house reminding him that the house is *his*.

Mexicans have a great dread of the operation of tooth-extraction, it is a common occurrence for them to call upon the dentist and ask for a "powder" to place on an offending tooth or root in order *to rot it away or cause it to fall out of its own accord*; any dentist who may have such a powder a fortune awaits him here in Mexico.

But greater dreads which make the hair of the Mexican stand on end are the fears that after a tooth is extracted, he will become blind, his eye-ball may jump from its socket. or his tongue may fall out, and should he be a one-legged patient he fears he will loose the power of his remaining leg.

Frequently the very timid Mexican will be accompanied by his physician in order to assure him that should any such accident occur he is there to push the eye-ball back into position, or hook the tongue on its hinge again, for not a few are under the impression that the tongue works on a sort of a hinge that can be hooked or unhooked at pleasure.

The Mexican physician will stand by and with soothing words endeavour to calm the patient, but before the operation is commenced he will quietly motion the Dentist aside and ask him in a confidential tone: "There is really no danger to the eye—is there?"

When the patient has been relieved of his molar, his physician prescribes a quart of mouth-wash, and several powders to be taken to prevent fever, the medicines are accompanied with strict instructions, to keep the blanket wrapped well around the jaws (nearly every Mexican wears a blanket), and be extremely careful not to walk or ride in the sun, bathe or wash himself.

The Mexican has an equal fear of anæsthetics, and as the

forceps approach the tooth, he devoutly makes the sign of the cross and calls upon his patron saint to protect him from blindness and death, he must always have "something" applied to the gums before the extraction of a tooth, a little water in a Mexican mouth will be found to give as much satisfaction as any known local anæsthetic, in many cases where Nitrous Oxide is administered I verily believe them to have the idea, that after the operation the dentist sticks an excavator into their bodies to let the enormous amount of gas they have inhaled escape.

Last December, a Mexican gentleman imparted to me a great secret for the painless extraction of teeth. I have not yet applied it in my own practice, but it may be worthy of attention amongst the younger members of the dental profession; no one who has a secret preparation for the relief of suffering humanity has a conscientious right to conceal it. So here goes.

My informant, a professor of mathematics and calisthenics (so his card stated) said, that the discoverer of this great alleviator was an old woman living near Guadalajara, a relative of his mother, to whom the secret was confided, and from his own mother the professor received it, he also cited the following case in defence of the wondrous liquid used.

Senor G., æt. 43. A wealthy farmer living at his immense hacienda ten leagues from the nearest dentist, after suffering several days with aching teeth, started off on horseback to have them extracted. On the way he called to refresh himself at the house of the old Mexican lady, and after relating to her in an agonized tone his suffering, the old lady simply smiled, telling him to return home as she had an infallible remedy.

She then gave him a bottle of milky looking fluid to use as a mouth-wash, with instructions to hold some of the wash in the mouth for several minutes before going to bed. She guaranteed the morning would find him toothless, at the same time shewing her own edentulous jaws in evidence.

The farmer returned home, used the wash as directed, had a good night's rest, and when he awoke in the morning beheld on his pillow a little pile of teeth which had left their sockets during the night.

This statement sounding to me like a *ghost-story*. I asked the professor if he did not think it would be rather dangerous should any one by accident swallow some of this great "bone-

remover?" would not the patient run the risk of waking up in the morning and finding his own skeleton lying alongside of him? "No, no," answered the professor, "the beauty of this liquid is, that it acts directly on the alveolar process and no other part of the body; it is not my intention," continued he addressing me, "to give the secret away, but seeing you are a particular friend of mine (I had loaned the professor twenty dollars four days previous) and knowing it will aid you greatly in the practice of your profession, I will tell you, it is nothing more or less than—*Suéro*." The professor then took up a Spanish and English dictionary which lay on the table and found the word "*Suéro*," which in English means "Whey,"—the serum or watery part of milk, separated from the more thick or coagulable part, particularly in the process of making cheese."

Had the professor returned the twenty dollars I loaned him I probably would not have revealed his secret, there may be something in it—who knows?

It only requires some one with a little spare time and courage enough to try it; then a patient must be selected who is desirous of losing all his teeth, should one or two teeth only require removal I would recommend the use of the rubber-dam to protect the sound teeth.

In the majority of cases where an artificial denture is inserted, the Mexican allows it to remain in the mouth uncleansed until he is compelled to return and have it removed on account of the inflammation caused by the filthy plate.

The use of tooth-brushes and dentifrices is little known in this Republic; one patient whom I presented with a box of tooth-powder after having scaled her teeth, wanted to know the dose, whether it should be taken before or after meals, and whether it would be better to take it in coffee instead of water.

Tartar of every degree of hardness and colour is found in abundance in Mexican mouths, the scaler frequently bringing away pieces weighing one quarter of an ounce at a stroke, in these cases met with in every day practice, equal parts of tincture of asafœtida and water should be recommended as a mouth-wash, it sweetens the breath wonderfully.

To satisfy the Mexican his artificial teeth must be nicely made (if a partial case no roots or tartar must be removed), plate very thin, no palate, and above all not to hurt and be firm in the mouth immediately it is inserted.

If these requirements are met, he pays his money willingly, after taking some old roots out of his pocket which you may have extracted for him or his family and offers them for sale in order to reduce his bill.

The Mexican has a very bad opinion of the dentist who will persuade him to have a tooth filled, but should he make up his mind to have it done, he will have amalgam or cement in preference to gold, as it is cheaper, yet in the majority of cases he demands its extraction being cheaper still.

If our profession called us to work on anything in Mexico, outside of Mexican molars, we could get along nicely in this great republic, whose people are polite, civil and obliging, although they frequently do not mean exactly what they say, and never keep appointments. Remember, I speak of the majority, not all, there are exceptions, but these exceptions are "few and far between."

THE PATHOLOGY OF ACTINO-MYCOSIS.

By JOSEPH ABBOTT, L.D.S.I., Exeter.

As this is a disease which bears directly upon dental surgery, or at all events should possess great interest for students and practitioners of dentistry, I will endeavour to give a more succinct and extended account of it than is generally to be found in dental text books.

Actino-mycosis is a disease which attacks cattle, notably cows and pigs, and is to be met with in the form of nodular tubercles in the lungs of calves. The primary lesion occurs in the jaw, and in eighteen cases out of twenty in the lower jaw. Like Equinia it is communicable to man, and it is considered an ailment of a very fatal character.

This disorder is characterized by the formation of tumours in the mandible very much resembling giant-celled Sarcomas, within which is disseminated constantly increasing spores of the Actinomyces, or ray fungi.

Taking all the morbid elements present in Actino-Mycosis a pathological observer cannot fail to notice that he has clearly before him all the symptoms diagnostic of chronic inflammation, for when the disease is somewhat advanced there will be seen

surrounding the masses of fungi many giant-cells, and external to them epithelial and granulation cells. Upon dividing the tubercles the section exhibits a porous appearance, and upon pressure a light-coloured, pultaceous material exudes, containing fat cells, and light chrome-coloured granules.

In the human being the symptoms are well marked and very characteristic. They commence essentially in the lower jaw, within, or in the vicinity of a carious tooth, or the first evidence of attack may be instanced by the exudation of pus from the socket of a recently extracted tooth.

Starting from its local origin, the fungoid growth extends to the cervical spine, giving rise to abscesses, or inflammation of the dorsal or lumbar spinous processes, culminating in caries of those structures, conjointly with the formation of sinuses. Secondary deposits in the heart, liver, lungs and kidneys tend to a fatal termination, which, as a rule, happens within a year from the onset.

1. That this disease is directly caused by the presence of a parasitic fungus, entophyte, or to put it more scientifically, a hyphomycetous fungus, there can be very little doubt, and it is only to be regretted that the exact botanical classification of the mould has not so far been cleared up. It is commonly called the *Actinomyces*, or ray fungus. The natural history of all cryptogamous growths or vegetable fungi is more or less interesting, and I will briefly describe the nature of those to which I have applied the term hyphomycetous.

All the vegetable parasites which play such an active part in the degeneration of either healthy or morbid tissues are denominated Thallophytes, a term referred to plants in which as regards a relation between stem and leaf no precise differentiation can be demonstrated, and moreover chlorophyll, *i.e.* the green colouring matter of plants, which occurs in a granular floating form in the fluid contents of cells, and only developed under the influence of light, and presence of iron—is conspicuous only by its absence. The pathogenetic fungi are

1. Bacteria, or Schizomycetes.
2. Yeasts, or Blastomycetes.
3. Moulds, or Hyphomycetes.

Now it is with the last we have to deal upon the present occasion.

Hyphæ or moulds, are made up of filaments produced by individual rows of cells formed lengthwise, and increasing by means of a conical cell which shoots forth, and separates trans-

versely by fission. The thallus or frond may consist of a single filament, but usually the hyphæ are multiple. All spring from a germinal tube which grows directly from a germinating spore.

As before stated in connection with the infective process in Actino-mycosis, the fungus spreads by spore formation, or reproduction, this latter may be either a-sexual or sexual. How reproduction by both methods is accomplished may be understood from what follows. A-sexual reproduction occurs thus :

I. Hyphæ arise from the mycelium or spawn, and spread diversely. The terminal cells divide transversely into conidia which either form vinculi, or fall away single.

II. A sporangiphore arises perpendicularly from the mycelium, and its extremity swells into a ball of protoplasm, which divides and forms conidia.

III. From the surface of an excrescence on the end of a conidiophore sterigmata sprout, and a new chain of spores is thus formed.

Sexual reproduction takes place by conjugation and fertilization. The apical cells of two hyphæ meet end to end and form a zygosporé ; from this a sporangiophore sprouts, and from its conidia new plants grow ; or the end of a hypha becomes of a spiral form until its threads pressing closely upon one another, form an ascogonium, or a continuous tube ; or certain cells form an organ termed an oögonium, in which oöospheres, *i.e.* female reproductive organs, single or multiple are formed, while other cells form an antheridium, or male organ, in which spermatozoids are developed. The oöosphere, which is hundreds of times larger than the spermatozoids, remains in the oögonium and fertilizes there. It is now called an oöspore, which either develops a new plant or forms cells.

The food of moulds is oxygen ; they can develop with or without light, and they flourish luxuriantly at a temperature of 37.5°. The spores are as resistant to external influences as bacteria.

Glancing, therefore, at the lives of these moulds, one would naturally imagine that they would have little chance of damaging healthy vital tissues, and it is so ; but this is a statement which must be qualified, for when the actino-mycos or ray fungus is acquired by infection from cows, &c., the moment inflammation starts, all the material for secondary and

ever-increasing inflammations are exhibited. You have suppuration containing fungus mycelia in its pus. You have it in the jaw, in the cervical glands, jugular veins, heart, lungs, liver, kidneys and intestines. Truly an appalling disease to combat. And how will you combat it? This is the inevitable question which presents itself as an extreme and important finality to a physician who having brought all his anatomy, physiology, pathology and other scientific knowledge to bear upon a case; who having put two and two together, and sagely, as a man of experience, has fixed his diagnosis, pauses; indeed, very often! and asks himself the question. What shall I give? Be the case simple or serious, his pause should not be long, for one of the most important acquirements of the physician is to have his therapeutical index and his pharmaco-dynamical lore, where? Oh, *Æsculapius*! but upon his finger tips. But when he faces Actino-mycosis, well may he exclaim "*Cui bono*," unless he makes up his mind instantly to excise the jaw primarily affected. Let him when dealing with Actino-mycosis remember the lines in Ovid—

Principiis obsta, sero medicina paratur
Quum mala, per longus convaluere moras.

and act upon the injunction therein conveyed.

The treatment I would adopt, I have just set forth, but there are other forms of treatment advocated. The exhibition of arsenic, strychnine, wine, brandy, bark, and the thousand and one medicaments denominated "*tonics*." They may be used as accessories, but they will not cure Actino-mycosis. One hint may be useful. Do *not* use peroxide of hydrogen as moulds exist upon oxygen!!!

In conclusion, I now proceed to enumerate those antiseptic lotions and injections used as palliatives, but if there is any one thing more certain than another with respect to Actino-mycosis, it is this, That when the primary lesion in the jaw is seen early, excision is the only hope for the life of the patient, and it *has* been successful.

ANTISEPTICS.

Efficient power thereof in solutions of distilled water.

Mercuric Chloride	1-20,000	Salicylate of Soda	1-250
Thymol	1-1000	Carbolic Acid	1-200
Benzoate of Soda	1-2,000	Quinine	1-200

Creasote	1-1,000	Cupric Sulphate	1-173
Benzoic Acid	1-1,000	Boracic Acid	1-133
Salicylic Acid	1-666	Zinc Sulphate	1-50
Eucalyptol	1-666	Alcohol	1-50

NOTES OF A CASE OF SCLEROTITIS APPARENTLY OF DENTAL ORIGIN.

A portion of a Paper read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, held in Leeds, August, 1889.

By JOHN HERN, M.D. EDIN., M.R.C.S. ENG.,
Ophthalmic Surgeon, Darlington Hospital.

MRS. Y., aged 38, a healthy, well-developed woman, the mother of three healthy children; no history or other signs or symptoms of syphilis, or rheumatism, or any other morbid constitutional tendency. The husband and relations are also well known to me, and have no particular constitutional tendency to disease.

On March 27th, 1888, Mrs. Y. consulted me for a severe pain referred to the point of emergence of the left infraorbital branch of the superior maxillary division of the fifth, pair of cranial nerves and shooting up over the left nasal bone; this pain came on in paroxysms several times during the day, and, as the patient described it, "inflamed her eye." On examining the left eye, tension seemed slightly above the normal, but, on comparing it with the right, they were found to be as nearly as possible the same; the eye was not tender to the touch, but at the upper margin of the cornea, about two lines external to the vertical meridian, a distinct patch of scleritis was observed, the contiguous corneal substance being quite hazy in its superficial layers. The patch at this time was about the size of the flat surface of a split pea. Although six-grain doses of quinine several times a day relieved the pain, the patch gradually spread outwards and downwards along the corneal margin, involving its superficial layers almost to the pupillary margin. I noticed the patch spread and enlarged most on those days when the patient complained of most pain referred to the infra-orbital region.

In August, 1888, my notes of the case read as follows : "Sclerotic patch has spread from the vertical meridian above to four lines internal to vertical meridian below, and has also extended two lines nearer the posterior pole than when first seen five months ago. Tension plus $\frac{1}{2}$ to 1 L. Pain now referred to all three divisions of the fifth (supra-orbital, infra-orbital, and the mental branch of the inferior dental) ; also pain in the upper and lower teeth of left side, especially the former. Patient complains that on taking anything, either hot or cold, into the mouth, the teeth ache (especially the left uppers), and that pains shoot up into the left eye.

The condition of the eye became gradually worse until late in the following month (September). There being an increase in the pain referred to the teeth, I asked my brother, Mr. William Hern, who was spending his holiday with me, to see the case, which he accordingly did, and discovered an exposed nerve in the second left upper bicuspid, and at once advised its removal, considering it the probable cause of the pain. The vision of the left eye was carefully tested late in September, and found to be $\frac{2}{3}$ L. Tension + 1 L.

On October 5th, the tooth was extracted, and examined by Mr. William Hern who found it to be an "upper second bicuspid of left side affected with a very large and deep carious cavity on its anterior surface, involving the pulp chamber, and a smaller and shallower one on its posterior surface. On splitting, the pulp was found to have been alive, its free surface ulcerating and covered with thin greenish pus, its deeper parts intensely red and injected ; the pulp tissue altogether being in a state of great irritation, and a potential cause of much pain, both local and reflex." He also says : "I have seen several cases amongst my patients at the Dental and Middlesex Hospitals of undoubted reflex ophthalmic disturbance due to dental caries, in which the lesion was less clearly marked than in this case. In a few cases which have been sent me from Moorfields or from the out-patient ophthalmic department of my own hospital, an exposed pulp in some lurking position has most commonly been found to be the irritating cause."

As to the progress of the case after the extraction of the tooth, the pain disappeared immediately and did not recur. For a fortnight the condition of the eye appeared to remain absolutely stationary, and then gradually the lesion gave in, and disappeared in from six to eight weeks, leaving a slight

haziness of the cornea, with the usual thinning of the sclerotic, giving the blue coloration of the choroidal pigment over the seat of the sclerotic patch. Tension in L. became equal to that of the R., and sight returned to the extent of $\frac{2}{3}$.

Having given a fair trial to all the recognised methods of treatment before the extraction of the tooth, I at that time ceased to administer all internal remedies, and simply applied a solution of boric acid locally. The gradual spreading of the patch up to the time of the extraction of the tooth, the sudden check produced thereby, the gradual diminution, dating from a fortnight after the extraction, and, finally, the gradual return of the eye to its normal condition, point, I think, to the probability that in this case, at any rate, we have an example of an irritative lesion reflexly produced, in which the afferent nerve is the superior maxillary, or second division of the fifth nerve, and the efferent the first division of the fifth and probably its nasal branch.

CARIES AND NECROSIS IN THEIR RELATION TO PRACTICAL DENTISTRY.*

BY J. H. MARTINDALE, M.D., D.D.S., Minneapolis, Minn.

(Concluded from page 867.)

We come now to the most prolific causes of caries and necrosis in the jaws, and alveolus, especially as encountered in dental practice. namely, traumatism—blows, kicks, bruises and the like, which are frequent causes, especially when occurring in individuals of scrofulous or strumous habit. A great many, undoubtedly the larger number, of diseased conditions of the maxillæ originate in diseases of the teeth or their sockets, and in ill-advised or careless dental operations. Among the former may be enumerated dead tooth pulps, encysted teeth, and delayed eruption of the wisdom teeth. And among the latter, heavy malleting, roots improperly filled and roots filled with improper filling (as cotton unimpregnated with any preservative medicine).

The writer has also frequently had occasion to note (once

*Read before the Chicago Dental Society and reported in the *Dental Review* w

he regrets to say in his own early practice), *necrosis* (never caries), as a result of the application of arsenious acid for the purpose of effecting devitalization of the dental pulp, the said application having been insufficiently well sealed from the fluids of the mouth. To the relief of the dental surgeon be it stated, that eminent authorities unite in saying, (and the writer's observation in practice also persuades him to the belief), that in addition to the cases of diseased maxillæ, the unquestioned result of cachexia, exanthemata, mineral poisons and traumatism, many cases occur which are without doubt idiopathic.

Emphasis is placed upon this fact, in consequence of the too frequent reproach cast upon skilled and discreet dental surgeons, that their ill-advised, or rough operations have induced the disease. The writer maintains that in certain cases the tissues adjacent to the field of dental operations, are in a condition peculiarly ready to take on an inflammation, which becoming an osteitis, then breaks down (in the manner described in the first part of this paper) into a veritable necrosis or caries. It should therefore be continually borne in mind that in many cases, which we are powerless to foresee, improper treatment of pulp canals, or improper filling, excessive or violent wedging, heavy malleting, and the like, may induce caries or necrosis.

Diagnosis.—In the outset, the indications that precede necrosis and caries, are not to be distinguished from maxillary or alveolar periostitis, and it is at *this* period that the timely and heroic use of the bistoury, cutting freely through the tissues down to the bone will often avert further disease—but *progressing*, instead of confining itself to local or circumscribed swelling, the gums become congested and swollen over a considerable area, and pus oozes from the margin of the gums, the teeth become loose, and in a few weeks the alveolus or maxillary plates also become disintegrated by a carious process; or necrosing, they lie dead and sequestered, bathed in pus. Pain is common in the early part of the disease, and is usually supposed to be tooth-ache; the patient's health often suffers greatly, symptoms of septicæmia, high temperature, sweats, rigors, etc., being frequently present.

Treatment.—All loose roots that cannot be made useful by the attachment to them of artificial crowns should be extracted. If, upon careful examination with a probe, we find that the bone is not diseased very extensively, that is, if caries has not

extended further than the immediate surrounding of the roots of one or two teeth, absorption and extrusion of dead bone may usually be effected by the use of sulphuric acid brought directly in contact with the area of diseased bone. The preparation of the acid which I prefer is that known as the "Aromatic Sulphuric Acid" (a thirteen and a half per cent. solution of the sulphuric acid of commerce, together with the aromatic principles of various spices). My method of using it is to inject it through the fistulous opening and directly in contact with the diseased bone by means of a hypodermic syringe, provided with a blunt ended needle, keeping it there for several minutes. I commence with a strength of about 70 per cent. solution of the acid, and soon increase it to full strength. This treatment, conjoined with the use of injections of the peroxide of hydrogen, the patient's health at the same time being toned up with tonics, and the bowels being kept freely opened by the use of saline waters and aperients, will often effectually remedy the trouble. But in some instances the diseased bone is not gradually consumed and cast off, but either large sequestra are exfoliated, needing surgical assistance in their removal, or a considerable area of honeycombed carious bone is formed, needing removal by other means than by the dissolving properties of the acid. My treatment of such conditions will be set forth more in detail in the recital of a few cases from my own practice. It should be remembered, as formerly stated in this paper, that the termination of a periostitis in a carious or necrotic condition may often be averted if commenced early enough by freely and deeply scarifying the gums, use of saline cathartics, rest, attention to diet, tonics, etc.

CASES.

Case 1. In February of 1882, a young boy of 19 years of age was brought to me by his father for a condition of fixation of the jaw, accompanied by a large swelling of the right cheek and enlargement of the lymphatics in the cervical and sub-maxillary region. The circumstance of extensive cicatrices upon the face, resulting in consequent contraction of the facial muscles and distorted features, immediately induced me to ask of his father the cause, and I was informed that the boy was affected seriously with scrofula, and that these were the result of several running sores on the face.

As the abscess (for such it was) upon his face had already

pointed, and I could not reach it in the mouth to void its contents there, I lanced externally and very fetid, greenish-yellow pus was copiously poured forth. Upon closely examining this pus I found therein contained small spiculæ of bone and upon exploring the abscess tract with a silver probe, I was easily able to discern the presence of an opening in the inferior maxillary bone, just anterior to its junction with the ascending ramus. There seemed to be no large sequestra of bone detected by the probe, but rather a honeycombed or porous feel to the walls of the sinus. The abscess cavity was very thoroughly irrigated with carbolized water, and the boy was sent home with instructions to take a tonic of iron and quinia and good nutritious food, and return in two days. It should be remarked that the patient had been having high evening temperatures for several days, and his general condition was much run down by pus absorption.

Upon his appearance at my office in two days, I found my patient with the abscess still discharging (I had placed a seton in the opening), but the enlarged condition of his face very much decreased. I was now able, by the aid of a wedge and anæsthesia, to get his mouth open, and the evidence of the origin of his trouble (combined with the scrofulous cachexia) was soon evident; a late and difficult erupting wisdom tooth. The tooth was lodged with its masticating surface presented in apposition to the posterior approximal surface of the second molar in front of it, and only one cusp emerging above the gums, which were very turgid and inflamed. With a physic forceps I managed to extract the offending tooth, and was then able to run my probe into the socket, and from there to the diseased tract in the maxillary bone, and so on out through the opening in the face which I had previously made.

I had now what I wanted, through drainage, and it was easy for me to inject my carbolized or other antiseptic fluids (we had not then peroxide of hydrogen at our command), through the whole diseased tract. My treatment now was a thorough scraping of the walls of the tract, with a dull scraping instrument, thorough and frequent irrigation with antiseptic washes, and a tonic treatment of the system with good food, iron, wine and quinia. After five or six days, the pus ceased to run, and in three or four days more the external wound was allowed to heal. The boy's health was renewed and the case dismissed.

Case II. I was called by a dentist, Dr. X., to see a case that had developed an undoubted carious or necrotic character. The patient was a lady aged about thirty-five years, and reported herself as possessing usually good health. Upon examination of her mouth it was seen that pus was escaping copiously from the gums surrounding the superior left central, lateral incisor, the canine and first bicuspid teeth. This condition had supervened not very long after the insertion of a not very large approximal filling in the lateral, but the circumstances were not of such a character as to suggest the probability of the filling being the direct cause, but seemed to point rather to its being of one those previously alluded to in this paper, whose origin can be ascribed to no direct source. For five or six weeks she had been subjected to the customary proper treatment with the sulphuric acid, the disease seeming not to abate, but rather to grow worse. The patient's health, also, had begun to suffer materially, her temperature running to 104, and she was generally weak and run down. Acid treatment having failed it was a question as to what should next be done. Upon examining the parts with a probe, it was easy to determine the presence of much diseased bone and several detached pieces. The central, lateral and canine were so loose that it seemed as though it would be easy to remove them with the fingers, while the first bicuspid had begun to be seriously affected. After careful examination it was deemed best to operate for removal of the dead bone, which was done as follows :

The patient being anæsthetized, holes were drilled into the pulp cavities from the lingual aspects of the central, lateral and cuspid teeth, all of which were found to contain dead pulps. Then a splint which we had made of vulcanite was placed in the mouth, and to this the central, lateral and cuspid were securely ligatured. This was to prevent the dropping out of these teeth during the operation, which would otherwise undoubtedly have occurred. I then made a linear incision about an inch and a half in length, parallel with the margin of the gum, and about one-half of an inch above the margin. In then passing down into the gum, the alveolus was found to be entirely dead, some of it absorbed and carried off with the pus, and a number of the dead pieces were lying detached in the wound. These were removed with gouges, chisels and spicula forceps. We found as we went on a considerable portion of the anterior external face of the maxillary bone was involved. When the bone had all been removed, it was

found that we had a space presenting an aperture about an inch long, and three-fourths of an inch high, and perhaps nearly an inch deep. It extended posteriorly to the antrum, and in front to the median line. The palatal surface or floor of our cavity was all devoid of bone, and naught remained there for quite a space save a mucous membrane partition separating it from the mouth. In one place the cavity opened into the nasal fossa, about an inch back from the nostril. The roots of the lateral and cuspid teeth projected entirely bare of any bony investment into this cavity, as also did the apices and sides of the bicuspid and central. During our operation the cuspid came out entirely, and although we began to think that it was a very forlorn chance to save any or all of the teeth, we tied it back in its place.

Every step in the operation, it should be noticed, was done under constant irrigation with bichloride of mercury solution, and all the probes and instruments were thoroughly immersed in this antiseptic wash before and during use. We now plugged up the opening with iodoform gauze. The next day considerable swelling of the face was found, but otherwise everything seemed favourable.

Upon removing the dressing we found, to our satisfaction, not a trace of pus, but healthy lymph, and every evidence of a healthy wound. To be brief, I will say that from the day of the operation we saw no pus; about every three days we removed the dressing, we found the reparative process going on splendidly from the bottom; soon the opening into the nares closed, bone formed around the roots of all the teeth. The patient's general health began to mend from the time of three or four days after the operation. The next and last case with which I shall burden you is one of very frequent occurrence in our practice; not usually very dangerous to the general health, it is none the less often attended with very considerable loss of alveolar substance and loosening of the teeth. The disease is sometimes very obstinate in yielding to local medication, or to the use of aromatic sulphuric acid, but by simple surgical removal of the diseased bone it will almost always cease. To illustrate, I will select at random from a number of similar cases in my practice.

Case 3. Miss M— applied to me to relieve her of a discharge issuing from a fistulous opening in the gums, between the superior left lateral incisor and cuspid. She reported the discharge to have existed almost continuously for over a year.

Upon examination of the lateral, which was filled upon its mesial surface with gold, I easily discovered it to contain a dead pulp. I immediately drilled a hole through the lingual aspect of the tooth, and, upon entering the pulp cavity, found it to be filled with a fluffy substance, which upon removal, was found to be a mass of cotton wool, which the patient said had been placed there about two years ago by a dentist who had filled the tooth. I then, after as thoroughly cleansing the pulp canal as possible, filled the said canal with a dressing of floss silk and iodoform, and dismissed my patient for a week. When next she came I removed the iodoform dressing, thoroughly washed out the canal, and entirely filled it with oxy-chloride of zinc. I then took a probe, and passing it down through the fistulous opening was able, easily, to discern the presence of soft, dead bone, which I proceeded to remove with a bur in the dental engine; however, to reduce pain and diminish hæmorrhage, I injected as deeply as I could penetrate with a blunt hypodermic needle into the fistula, about eight minims of a four per cent aqueous solution of hydrochlorate of cocaine. I then proceeded in two or three minutes to remove with the bur the dead bone, which I could easily detect by its feel, and entered a cyst or enclosure, about the size of a small marble, to which the fistula led. The sides of this I thoroughly scraped until I was sure the walls were composed entirely of live bone, and also burred off the apex of the root of the lateral incisor which was projecting into the wound. I then very thoroughly washed out the cavity with carbolized water, and after inserting in the orifice of the wound a tent of antiseptic cotton I dismissed the patient, who said she had suffered no pain during the operation. The next day I found some pus, and injecting freely with hydrogen peroxide directed her to use it herself three times a day. She did so; in three or four days the pus ceased to flow, granulations of new tissue began to appear, and in about four weeks the orifice healed up, and since then has shown no disposition to recur. I would say that I have purposely selected cases from my case-book, occurring and operated upon five, six, and seven years ago, since I have been enabled for years, and up to the present writing, to watch said cases, and can certify that there has been in them no recurrence of disease. The last one, that of the alveolar abscess with cyst, and fistula, is selected at random as a type which is constantly presenting itself in your

essayist's practice, and being treated by him substantially in the manner described, yielding in the great majority of instances satisfactory results. In brief, my efforts are directed by every justifiable surgical or mechanical means, in *caries* toward changing a chronic ulcerating condition of the bone, progressive, and non-healing in its character, into a healthy wound, presenting features of acute inflammation and capable under skillful, and judicious treatment of casting out new products, and repairing waste of tissue. I have found it expedient in latter years to abandon the dental engine as a means of burring out carious bone, as I have found by experience I can follow more closely and safely and feel more delicately and surely my way, with a system of gouges, chisel and scoops which I possess. In closing this essay, which your indulgence has permitted me to present, I would mention with thanks the assistance which I have received from works on kindred subjects by Messrs. Christopher Heath, McNamara, T. Bryant, Holmes and our most worthy confrères Drs. L. C. Ingersoll and G. V. Black.

Reflections from the Surgery.

NOTES OF A FATAL CASE OF NITROUS OXIDE ANÆSTHESIA.

(Kindly furnished to us by the Operator.)

LADY MILNE called on me on September 28th with a note from Dr. McBride, whom she had consulted with regard to a discharge of pus from left nostril of a year's standing. Dr. McBride had examined the patient, and came to the conclusion that it was a case of disease of the antrum, and sent her on to me for treatment. I found on examination the second left upper molar abscessed and very painful on pressure, the outer alveolar wall over roots of teeth was also swollen and painful. I informed her ladyship that I should require to remove this tooth, and also the third left upper molar which was not in a good condition either, and that an opening would require to be made into the antrum through the socket of one of the teeth.

I proposed that Lady M—— should take nitrous oxide gas for the operation, which is the anæsthetic I have always employed. She agreed to this, and asked if she required to bring her medical attendant with her ; I replied, "Do so by all means, though it is not absolutely necessary to do so." Lady M—— mentioned also that she had a weak heart, but I thought nothing of this, as it is a common expression for patients to use, and meaning as a general rule very little. I made an appointment with Lady M—— for Oct. 1st, at twelve o'clock. Punctually to the time she came, accompanied by her husband and daughter. Patient was stout, somewhat pale and flabby-looking, her age owing to the manner of dressing I took to be about sixty, but I found afterwards she was seventy-one. On being seated in chair, I asked patient when she had breakfasted. She replied nine o'clock. The upper part of dress having been undone I proceeded, with the aid of an assistant, to administer the gas. Her breathing I noticed was weak and shallow, so I requested her to take deeper inspirations ; however, there was not much improvement.

I continued the administration till I judged she was fully anæsthetised, took away the face piece, removed the two teeth and made a free opening into the antrum, from which then flowed a good stream of pus, and was swabbing this away with a sponge when I noticed the face assume a very alarming appearance, and respiration becoming almost imperceptible. I immediately sent off my assistant for medical aid, placed the patient in the prone position, pulled out the tongue with forceps and cleared the back of the throat from blood and mucus, elevated the larynx, and compressed the walls of chest to try and induce respiration. Nitrite of amyl was also applied to patient's nose, but there was no response. Three minutes after Dr. W. Brown came in, and he injected ether first into the wall of the chest, and finally direct into the heart—artificial respiration being carried on for a considerable time by Dr. Brown and myself without any result. When I first became alarmed the face had assumed a white and waxy appearance. A minute or so after this the face exhibited a bluish hue, which broke up into patches, lessening and gradually disappearing, leaving the face of a yellowish colour, but with a very peaceful expression.

Since the death I have been informed by her medical

attendant that Lady M—— suffered from fatty degeneration of the heart, so that, no doubt, syncope was the cause of death. What also contributed to it was the fact that her ladyship's corsets were found to be so tight that they had to be slit up with a knife. Miss M—— informed me that her mother had a presentiment that she would not survive the operation, and there is no doubt that Lady M—— was deeply impressed by this so much so that digestion was interfered with, her stomach being quite full of undigested food, which was ejected during the process of artificial respiration.

HYPERSENSIBILITY OF TEETH.—Dr. H. H. Edwards writing for Spain to the International Dental Journal says:—Such a case presented itself to me the other day. A patient came complaining of hypersensibility of the second right upper molar. It stood alone, occluding with its fellow below, was slightly loose, had no decay, but so sensitive to heat and cold—on account of the roots being denuded—that eating and drinking was simply a misery. I tried all the means I knew to reduce the sensibility, but without avail. Killing the pulp or extracting the molar were means I hesitated to employ except as a last resource. The suggestion of wearing artificial teeth did not meet with his approval, by which means the tooth would have been covered with the plate, and would have no doubt improved the situation. I took, as an experiment, cotton-wool and mastic, and tried a strand around the molar; the result being satisfactory, I took an impression of the molar with wax—being preferable to modelling compound on account of the temperature necessary—and made a very thin shell of vulcanite perfectly fitting the tooth to the margin of the gums, leaving the crown exposed for the purpose of articulation. The shell or overcoat, cemented on with oxyphosphate, has been in wear a month, and has completely frustrated contact with heat or cold. I may say it has proved a success. By such simple means I have been enabled to save the molar alive and receive the thanks and confidence of my patient.

British Journal of Dental Science.

LONDON, OCTOBER 15th, 1889.

DENTOGENY.

THIS subject which has remained in abeyance for a considerable period, was the subject of an able article by Mr. Hopewell Smith in the August number of the *Dental Record*.

Since Boedeker's and Abbott's observations on the structure of enamel nothing new has been advanced in the field of dental histology. The older teaching of the structure of enamel and also of its development cannot as yet be said to have received its death blow; moreover there is a completeness in the observations made, which renders it a matter of great difficulty to refute the theories advanced as to its development and consequent structure. Not so precise, however, are the theories, and the observations in their support, of the development and structure of dentine. Here the main question at issue is:—What is the function of the Odontoblast? Does it form matrix, fibril and sheath? Tomes, Boll, Beale and Waldeyer say it does, while Leut and Schäfer think the fibril and sheath are formed by the odontoblast and that the matrix is "probably shed out by the odontoblasts." Klein states that the odontoblasts are responsible for the dentine, but the fibrils are processes from a deeper layer. It will be observed that there is almost an unanimity amongst these great histologists as to the function of the odontoblasts.

It has often been pointed out that the evidence is very incomplete; we will name one which has proved so far insuperable. No one has yet observed the calcification of an odontoblast. It was recently advanced that the pulp was to be regarded as a ganglion and the fibrils as processes from the ganglion, and Mr. Smith has shown the homology which exists between the odontoblasts and a nerve cell, and argues from analogy

that the function must also be similar. This for practical purposes is important, as will be shown later. Next, Mr. Smith states his own view accounting for the matrix, he says "the dentinal matrix is a secretion from the small branched and round cells lying in close proximity to the membrana eboris," but he has nothing to support his theory : when an older theory is destroyed to one's satisfaction, something must be put up instead ! Setting this aside,—the strength of his article does not lie here,—but in the argument against ascribing so much as the functions of an odontoblast. The fibrils and sheath he thinks are clearly from the odontoblast, and the latter he considers as a sense organ. There are one or two difficulties to be overcome before this portion of Mr. Smith's contention can be received. It is a well-known fact that after the tooth is fully formed in the adult the pulp cavity becomes smaller as age advances ; the tubules are closed in localised areas, where as far as we know it must be due to the fibrils or the cells of which they are the branches. As we before mentioned, this latest view has an important practical bearing. It is not seldom we are told by patients that the nerve is touched when we are certain the pulp is yet at a distance, and we deny that the nerve is touched. According to the view to which Mr. Smith has given a histological basis, we touch the nerve whenever our instruments pass over a fibril. It is to be hoped that we have not heard the last of the subject, but that other observers will testify to the facts they have observed, and that even before very long we shall know absolutely and clearly how dentine is developed.

GARGLE FOR SORE AND LOOSE TEETH.—A teaspoonful of the following solution in a tumbler full of tepid water is a valuable gargle, or rather mouth wash for use after cleansing the teeth. Dr. Quincery whose prescription it is has found marked comfort follow its habitual use : Tannic acid 8 parts. Tinct. of Iodine 5 parts : Iodine of Potassium 1 part ; Tinct. of Murrh 5 parts ; Rose water 200 parts.

USE AND ABUSE OF DRUG-HABITS :—In the course of an editorial the *Dental Review* gives the following sensible remarks : To the already long list of drugs, the use of which, under proper restrictions, is both beneficial and proper in combating the various ills to which flesh is heir, but whose abuse becomes a curse to humanity, another has recently been added. Scarcely have we learned to properly use antipyrin than the tocsin of alarm must be sounded against its abuse. The recent discovery of its value as a nerve-tonic places it on the list with morphine, chloral, cocaine, etc., so seductive is its gentle soothing influence upon the over-strained nerves. Its victims are already found, especially among society women, whose nerves, strung up to a high pitch by the overwhelming demands of a winter season of gaiety, seize eagerly upon anything that will afford relief from the headaches and other disorders arising from prolonged fatigue and overtried nerves. So pleasing is the effect that it is soon used for every trifling ill feeling, until the patient find herself unable to live without it, and the fascinating “antipyrin-habit” is formed. Properly used as a nerve-tonic, its effects are admirable, but *abused*, the victim becomes even more hopelessly entangled than the morphine or the cocaine victim. The effects vary with the dose. In large doses it produces complete relaxation with loss of reflex action. In moderate doses, continued, it induces convulsions. As a stimulant its effect is much like that of quinine.

CONTOUR OR CROWN.—WHICH ?—Dr. J. W. Wassall says : “The tendency just now is to crown rather than make large contours. I should rather incline to making large contour operations in young patients than to removing the crown, providing it will last but a few years. If we are certain that the filling will preserve the tooth for say five years, in a young person, I would prefer to make the filling. The crown will come soon enough.”

Abstracts of British & Foreign Journals.

DENTAL REVIEW.

CHLORIDE OF METHYL.

By M. L. RHEIN, M.D., D.D.S., New York, N.Y.

The dental profession has long been in search of some practical means of alleviating the intense suffering which is often inflicted upon patients while preparing teeth for filling. Creosote, carbolic acid, potash, glycerine, cocaine, chloride of zinc, and various other agents are in daily use to accomplish this purpose. Some advocate the use of the sharpest and swiftest revolving burs; others of intense heat; and again others of extreme cold. All these agents have obtained their reputation by producing a more or less complete stage of anæsthesia of the terminal ends of the nerve fibrillæ, the results varying. It is probable that there is rarely any absorption of a remedy or persistent benefit derived from it. Local anæsthesia of the dentine as obtained at the present time, is probably the result of counter-irritation. Of all the counter-irritants, extreme heat and cold are the most effective. Chloride of Methyl was discovered in 1834. At ordinary temperature it is a colourless gas of slightly etherous odour and sweetish taste. It boils at 23° C. Above this temperature it can be kept in a liquid state only by keeping it under high pressure in very strong air tight vessels. When relieved from pressure it returns at once to a gaseous state, producing a reduction of temperature from—23° C. to as low as 40° C. A. Peyronnet de Lafonvielle writes of eight cases of trigeminal neuralgia of long duration which were relieved after several applications of chloride of methyl. Dr. Jacoby says: "In five cases of trigeminal neuralgia, the pain was entirely relieved after the first application. In one of the fresh cases there was no return of the pain. In two others the pain returned and a second application was made, with the result of relieving the pain again. In these also there has been no return. In the fifth case relief was obtained after each application and although six applications were made, there is no

sign of permanent improvement. Dr. Jacoby thinks that we have in the Chloride of Methyl a reliable analgesic, which does not affect the general condition of the patient, and that it is invaluable in the treatment of neuralgias, for the immediate relief of severe pain." In the first successful experiments, the substance was placed in an ordinary thick glass syphon, provided with an attachment piece by means of which a fine spray could be produced. Numerous explosions of these syphons caused their abandonment. The apparatus as at present constructed consists of a copper cylinder having the capacity of about one litre. Above the cylinder is a strong screw which when fastened down prevents the escape of the methyl. When this screw is loosened the fluid escapes through a lateral opening into a smaller brass tube through the mouth of which it comes in the form of a fine spray which can be regulated in the most delicate manner by means of a micrometer screw. The brass adjustment is not well calculated for reaching the distal aspects of the posterior teeth, but does very well for other surfaces. There are three methods of application, as follows : first, the direct application of the spray ; second, the glycerine method of Bardet. The part being first covered with glycerine the spray is directed against it, and the frozen glycerine is supposed to produce a more intense degree of cold ; third, consists in making a tampon of prepared cotton which ought to be enveloped in fine silk ; (the cotton can be covered with glycerine if desired), and while being held with a pair of dressing forceps, deluged with spray and then immediately pressed against the painful point. The intensity of cold obtained by this method depends upon the amount of pressure with which it is applied against the surface, and it is supposed will produce a more intense cold than either of the other methods. It requires, however, too large a tampon to make it practicable in average sized cavities of teeth. This is the method, however, which seems to produce the best results in the various forms of facial neuralgia. The writer has found it invaluable for producing relief and curing incipient pulpitis by means of the intense degree of counter irritation which it produces. The tampon should always be pressed against the point where the seat of the pain is, but care must be taken not to hold it too long in position, lest it cause a blister or eschar. The tissue becomes pale and hard following the application and there is a momentary burning sensation followed by an immediate relief from pain.

In numerous cases the pain returns again and often it requires three or four successive applications to obtain a permanent cure. There are, however, forms of deep seated neuralgia, which while they are temporarily relieved, occur again at intervals. According to Dr. Jacoby when the neuralgia is situated in the nervi nervorum the severe cold entirely destroys or completely paralyzes these nerve filaments, but when the seat of pain is in the nerve fibre itself, being not so accessible, the pain returns. Mr. M., a professional vocalist, was sent to the writer for relief from severe neuralgic pain. A dentist in extracting the right inferior third molar had removed all of the process and a sufficient amount of the maxilla to expose a portion of the inferior dental nerve; cocaine produced a short respite; but the patient returned soon after with a recurrence of the pain and an agonising appeal for something to be done for his relief so that he would be enabled to sing that evening. Thinking of the chloride of methyl, and having sent for Dr. Jacoby's cylinder he used a tampon which resulted in complete relief. Then follow some cases. March 5, Mrs. L. presented herself to have the posterior approximate and crown surfaces of the left superior second bicuspid and the anterior approximate and crown surfaces of the left superior first molar filled. Within the past two or three weeks she had a number of cavities filled without much pain. She was not of the nervous class that suffers from the slightest touch of an instrument. The excavation of these cavities proved to be excruciatingly painful; they were deep but did not reach the pulp. The rubber dam having been applied and the cavities dried, the cylinder of methyl being held in the left hand and the screw having been loosened, the nozzle was pointed as near the cavity as possible, and with the right hand the micrometer screw was opened for about fifteen seconds. After this application the cavities were thoroughly prepared by means of large engine burs and hand instruments without causing the slightest pain; the patient complained of a momentary sensation when the spray first struck the tooth's surface, but was delighted with the result. No bad effects have been noticed up to the present time, and on July 10th, it was found that the tooth responded perfectly to the cold and heat, showing that the pulp had not been injured.—March 18, Mrs. K. had a large cavity in the left inferior second molar to be filled; she was of that intensely nervous temperament, that dreads every movement the operator

makes. She was very sceptical, and the first application of the spray to the tooth was not very effective. Due probably to using an insufficient amount of methyl. A second application produced complete local anæsthesia.—March 21st, Mr. P., aged eighteen, a very nervous young man, and difficult to operate for; the right superior second bicuspid had a small cavity on the posterior approximate surface which was very sensitive. The application of the chloride of methyl produced complete local anæsthesia which lasted about two and a half minutes. It required two applications to prepare the cavity. April 3rd, Miss C. presented herself suffering with a toothache so severe as to cause an intense neuralgic headache. The second superior right molar had a large cavity reaching almost to the pulp; it was excruciatingly sensitive to the touch; the application of the methyl produced a momentary degree of pain which was very intense, but in turn this was followed by complete local anæsthesia and an immediate disappearance of the headache. Sensation returned before the cavity was entirely prepared, and a second application was required to complete the operation. A temporary oxyphosphate filling was inserted, and there was no recurrence of pain.—April 19, Miss S. had cavities on the anterior approximate surface of the second right superior bicuspid and the posterior approximate surface of the first right superior bicuspid. They were acutely sensitive to the touch, but an application of the methyl produced complete local anæsthesia and a temporary stopping of gutta-percha was inserted. On May 6th, after removing the stopping, the cavities were found to be so acutely sensitive that another application was made, the result being that gold fillings were inserted without the patient having any appreciable sensation of the operation.—April 22nd, Miss F., of nervous temperament, had a cavity on the posterior approximate surface of the second inferior left molar it was impossible to obtain direct access to the cavity with the nozzle of the spray apparatus, as then constructed, but an application was made as well as possible. It seemed only to increase the pain, and a second and third application produced no better result. The patient endured the pain, and had the cavity filled, but complained of intense suffering from the tooth during the following two nights, when the pain disappeared. On recent examination the pulp was found to respond perfectly to heat and cold.—April 26th, Mrs. F. had filled with copper amalgam on the day previous a cavity

on the posterior approximate surface of the second superior left molar. The cavity was very deep, reaching under the gum, and though very sensitive no application was made on account of its inaccessibility. She had suffered all night with pain from the offending tooth, and there were present all the symptoms of incipient pulpitis. A tampon of cotton having been covered with glycerine and thoroughly saturated with chloride of methyl, was pressed firmly on the gum at a point where the apices of the buccal roots were supposed to be; immediate relief ensued. In about five minutes pain returned and again disappeared after another application. After longer intervals there was a recurrence of a lesser amount of pain, but after the fourth application the pain disappeared not to return.—April 27, Miss S. had the first inferior right molar filled with copper amalgam six months previously. It was very painful at the time, and has always remained sensitive to cold and heat, which symptoms have increased in severity during the past week so markedly as to indicate approaching death of the pulp. After applying the rubber dam, the tooth was thoroughly saturated with the methyl spray, which produced immediate relief from all pain. With a recurrence of pain, four separate applications were made, after which the rubber dam was removed. The patient experienced complete relief for about 20 minutes, when, according to her statement, the pain returned in a more intense form than had yet been experienced, and seemed proof against all counter-irritant treatment. An opening was then made through the filling into the pulp chamber, and the pulp removed. Out of 76 cases, 4 alone failed, and two of these are believed to have been due to the inaccessibility of the cavities.

ELECTRICITY AND ITS USES IN DENTISTRY.

BY DR. W. A. JONES, Minneapolis, Minn.

STATIC electricity is derived from friction of two bodies usually in the form of one or several revolving plates, with another body closely adjacent. Faradaic electricity, also called "induced," or "interrupted," is a current of high tension. The circuit of a battery cell is made to pass through a coil of wire, which encloses a bar of soft iron or a bundle of

soft iron wires. This bar becomes magnetised and demagnetised, and thus we have a current which is alternating; a second coil of wires is wound about the first, and a current is *induced* in this. Consequently the patient does not get his current direct from the battery cell, but from the outside coil of wire. In this form of electricity there can be no chemical action, as it is simply induced through a secondary wire. Many manufacturers of these batteries claim chemical action for them, but you can readily see how impossible it is. Any battery thus recommended can be thrown out as worthless and unreliable. Such instruments should not be marked *positive* and *negative*, as the duration of such condition is so short as to practically do away with them. He thinks a Faradaic current could be of use to obtund a nerve, or distract the attention of a patient from a painful tooth while the operator extracted. The effect in such cases is wholly cerebral; the sharp and sudden impression made by the current will for a time so effectually mask a tooth pain that the dentist has time to get in his deadly work before the nerve centres can comprehend the conflict of the two impressions. The only form of electricity that you can employ scientifically is Galvanism. It differs from Faradism, in that it is a chemical current and not induced. It is also continuous and not interrupted nor alternating; it always flows in one direction. There are an enormous variety of Galvanic cells, but it is only worth while to mention a few of the most important and those adapted to your work. If you do not care for expense, and if you want a small, compact, ever-ready and no-trouble instrument, the Barret Dry Chloride of Silver Battery is the best. It requires no attention, does not get out of order, always clean, always constant. It has a rheostat or current regulator, to prevent shock, etc. A 24-cell battery with outfit would cost £6 5s. You could work with a 16-cell battery of this kind. If you want something stationary, a battery that you can put in the basement, the Law Telephone Cells are recommended. When it is set up and connected the covers are fastened down. It will last without renewal for about two years; then the zincs can be changed and new solution put in, and it is good for another two years. The only objection to the battery is that the connections are not always perfect, and thus it *may* get out of order. To overcome this, Mr. Thompson, of the Minneapolis Construction Company, has improved upon the Law cell by

making clear, clean connections which cannot possibly become changed. The carbons are in one piece, and the regulation zines fit without alteration, and what is of some advantage the price is reduced. For good work you will need about ten such cells. They can be put out of the way and wires brought up to your chair from any distance. The current is always ready and under full control. The Gassner Dry Battery can be substituted for these cells if you wish; the only advantage is that they are dry; the disadvantage is that they are not as strong. The McIntosh, with which you are more or less familiar, will do good work, but it requires more care and is not so easy to manipulate or control. Whatever cells you use should be connected in "compound circuit" or "in series"; the carbon and zinc elements should be joined together and continued so throughout the entire series of cells. The wire which connects with the carbon element is the positive pole and the one from the zinc is the negative. This you should bear in mind. You can readily distinguish the poles by using coloured cords, as black and red. Now, this current should run through a regulator or rheostat. Through this you can use your entire battery, and thereby use all of your cells proportionately. You can use the smallest possible amount of electricity, or you can get the full force by a few turns of the instrument. Every one who has a battery should have a regulator. In addition, you want electrodes for making the application. You will find that an ordinary bur will make one electrode; the shaft of the bur ought to be coated with the following:

R Gum shellac (brown).....31
 Squibbs, sol. india rubber 31½
 Wood naphtha 32

Coat thoroughly with several layers; then polish and coat again until smooth. This insulates the shaft, and prevents the current from passing to any of the adjacent tissues, where it is not needed. The other electrode should be larger, about the size of a dime, or can be made elongated, and covered with linen or flannel, and simply placed upon the tongue, care being used to prevent the connections from being exposed. In this kind of electrode you can readily change the covering, thereby insuring cleanliness. Now we are ready for work. What do we expect to do, and how and why do we do it? A galvanic current is due to the chemical decomposition of one or more of the elements of a galvanic cell. It is constant and

continuous ; consequently it has a remarkable power of penetrating animal tissue placed in the circuit ; of producing electrolysis, used in electro-plating and electro-lighting. It must be remembered that it has no external manifestations of activity, because it has no interrupter. You can readily detect the galvanic current by placing the electrodes on each cheek. You will notice a metallic taste, you will find the amount of saliva increased, and, if the current is strong enough, you will get a flash, which, if stronger still, will knock you down. The human body offers an enormous power of resistance to the passage of electricity—it is said to be twice that of the Atlantic cable. Well moistened surfaces and electrodes diminish the resistance, and thus enable the current to flow easily. As a consequence mucous membranes, on account of their vascularity and moisture, offer but little resistance, while bones and teeth with their density and comparative dryness offer greater obstruction, still a current will go through them. Too strong a current will cause electrolysis. You do not want to cause electrolysis, you want to stop several degrees short of it, except when you are trying to reduce inflammation or to control hæmorrhage, or to remove growths. In electrolysis a certain amount of destruction or decomposition of tissue takes place. At the negative pole you get hydrogen and alkalies, and at the positive oxygen and acids, if you are using needles or penetrating tissue you will find bubbles of hydrogen at the negative and at the positive, if that be the working needle, the acids will encrust and corrode the point. Fungoid growths could be easily and readily destroyed by a moderate current. In such cases the negative pole of a battery connected to a fine broach or insulated needle could be passed up into the root canal—the positive electrode on the tongue or cheek—destruction of tissue would take place, shown by the accumulation of gas and the change in colour of the growth. With the aid of cocaine the operation would be painless. Any similar diseases, as Riggs, might be treated in a similar manner if you can reach the trouble. By electrolysis you ought to be able to destroy root sacs. But if you do not want to induce destruction of tissue, but nerve stimulation, you may still use the negative needle, but moderate the strength of the current, and move the application about, not letting it rest too long in one spot. In the treatment of flabby gums you can readily see the effect of the current by the redness of the part, showing that the blood vessels have

relaxed and more blood coming in. But if you wish to produce a sedative effect to relieve pain you reverse your electrodes; apply the positive pole to the spot to be operated upon, use that as your working pole. The current alone will obtund the tooth if applied for ten or twelve minutes, but you can hasten matters by the use of cocaine; the drug is carried into the tooth and materially diminishes the sensitiveness. In using electricity as a hæmostatic it is necessary to carry your application into the bleeding parts, and if possible pierce vessels. The needle becomes corroded from the acids and oxygen, and in this way coagulation of the blood takes place and act as any other clot. Great care should be exercised in the removal of the instrument—the current should be gradually decreased the needle slowly withdrawn, otherwise you may excite further hæmorrhage. In confined places the accumulation of gas may go on and infiltrate to much of the surrounding tissues and abscess result. This however rarely happens. It is well to be on the safe side and use mild currents and increase at the time of the sitting. In trying to relieve congestion, your bur electrode should be covered with absorbent cotton, and well moistened. Do not try to use a dry electrode, for your experiment will be a failure. The principal points for you to remember in the use of electricity are that the negative pole is tonic, stimulant, and destructive, while the positive is sedative or hæmostatic. You may think with others who have studied electricity that it makes no difference which you use—try for yourselves. Electricity, like heat and light, is a force powerful and but little understood.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

To the Editor of the British Journal of Dental Science.

THE EXTRACTION OF TEETH UNDER NITROUS OXIDE.

SIR,—I have read with great interest Mr. Ottley Atkinson's "Notes on Nitrous Oxide," more particularly that portion in which he states that he has "repeatedly extracted over a dozen teeth and roots (and in one favourable case eighteen were successfully extracted) during the anæsthesia produced by one administration."

Anxious at all times to acknowledge my shortcomings and failures, I desire to state my experience, and to give my opinion on multiple tooth extraction under gas, with a hope that a discussion may arise and throw more light on the subject.

Taking a case of the ordinary type (such as that in which Mr. Atkinson states that "an *expert* extractor will frequently succeed in clearing either an upper or lower jaw at one administration.") I find, that a patient requires from five to nine gallons of gas to produce full anæsthesia, the period of *full* anæsthesia lasting from ten to twenty-five seconds after the face piece has been removed, and that I can remove from one to three teeth or stumps, and, in favourable cases, four, which is a very different result from that obtained by Mr. Atkinson. I do not pose as an *expert* extractor, but, what is much more important, as a careful one.

I would like to ask Mr. Atkinson: 1. On the average what quantity of gas he uses for one administration? 2. To what length of time does *full* anæsthesia last? 3. Premising that he has abolished corneal reflex, does he extract after this reflex action has been re-established?

For some time back, I have been making enquiries concerning this multiple extraction under one administration of gas, from dentists in my own neighbourhood, who are in the habit of extracting any number up to seven or eight teeth or stumps at one time, and I find that their methods of procedure are very similar, viz: after the extraction of perhaps two or three teeth (or stumps) the patient partially regains consciousness and begins to struggle, but is at once held down in the chair by an assistant and the remaining teeth extracted whilst the patient is "coming to."

This is a practice, which, in my opinion, cannot be too strongly condemned, opposed as it is to all recognized teaching. No experienced operator would think of commencing an operation before the patient was fully anæsthetised, owing to the danger of a shock being conveyed to the heart by the inhibitory, (vagus) nerves; the acceleratory nerve centre being first paralysed, the vagus alone active and capable of conveying reflex sensation, but if the anæsthetic is pushed further, the vagus is in its turn paralysed, the reflex action of both centres is abolished, and while in this condition, no such danger need be feared. After the effects of the anæsthetic begin to fade, the nervous centres awake to resume their sway in the *reverse* order to that in which they were paralysed. The inhibiting cardiac nerve, therefore, being paralysed after the accelerating is the first of the cardiac nerves to resume its activity, and thus there is an interval during which the inhibitory nerve centre is alone open to stimulus. In this condition shock to the fifth nerve would affect the inhibitory nerves alone, there would be no counter-balancing influence; the result would be either stoppage of the heart's action or extreme depression. Is this multiple extraction worth the risk?

A man may go on in this way with seeming success, but some day he *may* have a fatal case. Who or what is to blame? The operator? Oh no. The gas? Yes! with the addition of some remark about "fatty heart," &c., &c. But I think had the operator contented himself with extracting fewer teeth; had he

not been desirous to beat some record in multiple extraction this disaster would not have taken place.

The only motive I have in writing this is, as I have said above, in the hope that a discussion may ensue.

I am, &c.,

Oct. 5th, 1889.

L.D.S., (Glas.)

Hospital Reports.

MONTHLY STATEMENT of operations performed at the Dental Hospital of London, during September 1889 :—

Extractions	{ Under Gas	751
	{ Adults	1013
	{ Children under 14	473
Stoppings	{ Gold	119
	{ Plastic.	582
Advice and Irregularities		180
Dressings		285
Total		3403

A. H. SMITH,	} <i>House Surgeons.</i>
A. R. COLYER,	
F. C. PORTER,	

Work done at the Victoria Dental Hospital of Manchester, during the month of September, 1889 :—

Number of patients attended		1098
Extractions	{ Children under 14	779
	{ Adults	67
	{ Under Nitrous Oxide	31
Gold Stoppings		121
Other Stoppings		345
Miscellaneous		
Total		1343

CHARLES H. SMALE, *House Surgeon.*

British Journal of Dental Science.

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INAUGURAL ADDRESS.

Read before the Manchester Odontological Society, at the
Opening Meeting of the Session, October 8th, 1889.

By WILLIAM HEADRIDGE, ESQ., L.D.S.I., President.

GENTLEMEN,—

Our Society, although young in years, is yet old in experience, as in our ranks we have many gentlemen who have spent a large portion of a life-time in the investigation and actual practice of the theories and processes that we meet periodically to discuss.

I am deeply sensible of the honour you have done me in electing me to preside during the year, over your deliberations ; and although I may not feel, in discharging the duties of the office, that I am acquitting myself with the success and *éclat* of my predecessors, yet I would have you kindly to believe that all the energy and application of which I am capable will be brought to bear to make our meetings successfully instructive, and with this end in view, I beg you will accord to me your hearty co-operation.

I have been reflecting for some little time on the choice of a theme upon which to address you to-night ; and I have thought it would be desirable on this occasion to eschew the wider sphere of dental politics and confine myself to one particular subject, and I now purpose briefly to ask your attention to the consideration of the question, of “Methods of retaining Artificial Dentures.”

We may say in the outset, that no denture, however perfect in its general construction, is a scientific example of dental mechanical skill, if the means of retaining it *in situ* are inefficient, a properly fastened substitute should remain in its place, with inappreciable discomfort to the wearer, both during the exercise of the functions of speech and mastication. The fastenings should be out of sight, and of such character and

adaptation, as exert no injurious influence, on teeth or soft tissues with which they may come in contact. The object to be distinctly kept in view in fixing a denture in position, is to allow it to exert on teeth or soft tissues, just the amount of pressure that is required and no more. Injury arising from the wearing of substitutes, invariably results from their fitting too tightly ; loosely fitting plates rarely cause any harm.

If it be a denture to be worn in the upper jaw and where teeth are remaining, the mere overcoming the weight of the substitute by the fastening medium is amply sufficient. For we must remember that every time it is subjected to pressure, it is brought into forcible contact with the surface over which it fits, and thus a renewal of co-adaptation is continuously taking place. Such support is, however, more than sufficient for a denture under similar conditions in the lower jaw, where it is keyed, or prevented from moving laterally or posteriorly. For example, suppose a case by no means exceptional, where the six front teeth and two third molars remain. To meet these conditions, all that is necessary, is the construction of a denture to supply the teeth that are absent, without any fastenings whatever, and simply let it drop into its place. But in a lower, where the six front teeth only remain, some means must be adopted to fasten the denture so as to prevent it sliding away from these teeth, otherwise, it is certain to impinge on parts it was not made to fit, and thus cause suffering to the wearer. The great tendency of such cases to slide backwards even to the extent of displacing the teeth to which they may be fastened, is one of those difficulties that can only be overcome by the display of much ingenuity.

Where the mouth is edentulous, the affixing of a denture is necessarily a much more difficult task. In such cases, facilities for anchorage do not exist, and the practitioner is often at his wits' end to obtain sufficient stability, to enable the patient to perform the functions of mastication with approximate success. For talk as we may about the theory of atmospheric pressure, we cannot ignore the fact, that in the upper maxilla, in a large number of cases, we have a conformation of surface and character of tissue to deal with, by no means favourable to the atmospheric adhesion of a denture. And the oft innocently expressed desire of patients, in their early experience, to have full lower dentures tightened, is a nut hard to crack, even to the greatest adepts in this class of work.

We may well pause, before venturing on the definite statement, that suction dentures can be adapted to all mouths. The age and temperament of the patient, are very important considerations in the treatment of such cases. Difficulties that are comparatively easily overcome, by say a patient 30 or 40 years of age, may be almost unsurmountable by a patient of 60 or 70 years. With some patients no amount of persuasion, and firmness on the part of the operator, is of much avail, and in the end springs have to be resorted to as a solution of the problem.

Having thus far enquired into the nature of the support essentially necessary for the comfortable wearing of the artificial denture, we may now briefly consider how this end may be accomplished.

If, we go back into the far past of dental mechanics, we come across some very crude attempts in the construction and adaptation of bands and other forms of fastenings, horsehair, silk and linen thread and fine wire ligatures were some of the methods adopted for securing artificial substitutes. A denture held in the mouth by such means would not be conveniently removable for purposes of cleansing, and would be worn continuously until the fastenings decayed or broke away. In the flourishing epoch of bone work, partial dentures were commonly fastened by inserting pieces of compressed hickory, or other wood into the substance of the bone, and these were made to form points of contact with the mesial, and distal surfaces of teeth remaining in the jaw, thus a steady hold was obtained. This system yet finds favour with some practitioners who back up canines to take the place of natural bicuspid and molars, inserting a tube in the backing to receive the hickory peg. The same object is also accomplished by soldering hollow, angle shaped, slightly tapering standards, perpendicularly on the plate in close proximity to the side of a tooth. Into the hollow of these standards, are fitted pieces of hickory, which on being trimmed down, present a flat surface to the side of the tooth, and grip it much as an ordinary band would do. This method is only applicable to fairly straight teeth, as manifestly no serviceable contact can be got, where the teeth are of a sharply tapering conformation. All the support that is required for holding a denture in place, excepting in cases of very short teeth may be obtained by the use of wooden pegs or wedges, but these have one serious disadvantage, they absorb and keep in contact with the tooth, moisture and

secretions which are undergoing continuous chemical change. Where hard rubber plates are used for partial dentures, it is very questionable whether any fastening medium other than the material of the plate, is at all necessary.

By careful modelling and fitting, the rubber may be brought into absolute contact with the teeth selected as a means of support. In exceptional cases of deep undercuts, caused by narrow necked or slanting teeth, a little vela rubber may be packed into such places. Where it is necessary to break contact between natural and artificial teeth, a little white rubber may very conveniently be used. These, and many other simple expedients, that will easily occur to the enquiring mind, and make it possible to dispense with metal fastenings in the majority of rubber cases. But where a metal band or clip is unavoidable for the support of a vulcanite denture, it should be constructed with just the same accuracy and finish, as if it were going to be used for a metal plate. In rubber as in all other cases I would say let the plate so fit as to make every tooth in the jaw a practical means of support, thus no individual tooth is exposed to the risk of being loosened or otherwise injured, through being made to bear all the strain. This end, as we shall presently see, can be attained with metal as easily as with rubber. I am disposed to believe, that there is really more mechanical skill exhibited in the making and adjusting of bands, than the swaging and fitting of the plate. The time at my command will scarcely admit of a detailed description of the different shapes of fastenings. Those, however, with which we are most familiar, are the spring V-shaped clip, found suitable for canines and incisors, the broad band for molars, the half round wire for short molars and bicuspid, and also the so-called basket, or what may be termed compound band. This fits high up on the tooth leaving the neck quite free. The idea influencing the use of this form of attachment seems to be that a tooth so clasped having a large portion of its lingual surface freely accessible to the cleansing action of the tongue, is thus less liable to injury. It seems to be yet a point of controversy, as to whether teeth suffer from the mechanical action of clasps, or from the chemical action of secretions. I am of opinion, that the one is as much a cause as the other, and it should clearly be the aim of the practitioner, to minimise the mischief by getting as perfect co-adaptation of clasps as possible. An accurately fitting clasp, carefully polished and burnished on the internal surface,

will exert no appreciable mechanical effect on the enamel, and will afford no lodgment for decaying particles of food. But a badly fitting clasp, with sharp edges and innumerable plier marks, will inevitably be the cause of mischief both mechanical and chemical.

The mechanical manipulations involved in the construction of clasps, we are all familiar with, and I do not refer to the matter in this connection, with any idea of propounding new theories, but rather to express my preference for some of the methods I have found most serviceable in my own practice.

I do not believe it is possible, to satisfactorily fit bands in all cases, solely with the pliers, as we occasionally have to deal with teeth, having no approach to a plane in their entire contour. Such shapes we find in short molars and canines. In such cases, I find what we may term a built up clasp the easiest to make. A very thin piece of hard platina, pressed about the tooth with a blunt pointed tool, then swaged between the dies and after the redundant metal is trimmed away, the inner surface coated with Spanish White, and gold of any quality found most suitable is evenly flushed over its outer surface. In this way we get an absolutely fitting band, with a surface of pure unoxidizable metal in contact with the tooth.

In those cases where bands are fitted in the ordinary way with pliers, it is seldom that perfect contact is obtained at the cervical edge. To overcome this difficulty, if the tooth be of an average length the edge of the plate may be easily fitted close about the neck, and the band can then be soldered on to the plate instead of against its edge. It takes a little more time to form the joint, which must be a thoroughly good one preparatory to soldering, but the time is amply compensated for by the result, as a perfect fit is secured at that part of tooth and gum, where particles of alimentary substances are most apt to lodge.

It is well to keep in view that the enamel covering is thinnest at the necks of teeth, and mechanical fittings about such parts should be so constructed as to minimise the amount of friction as much as possible. The accurate fitting of a band, necessarily implies a perfect model of the tooth to be fitted, and as this is not always obtainable, it will be found necessary in some instances, to supplementarily fit the bands to the teeth in the mouth, afterwards soldering them on to the plate one at a time. Hard sealing wax, which on breakage leaves a sharp

fracture, is the best cement for temporally uniting plate and band, where this process is adopted, the ordinary work-room formulæ of wax, resin, and Canada balsam are no use for this purpose. In deciding upon the exact form of clasp, or band suitable for each individual case, account must be taken of the condition, position and shape of the teeth available. These may be found deviating from their normal position to a greater or less degree. They also although firm in their sockets may be elongated, and thus bite into edentulous spaces, and on the mesial or distal surfaces of teeth in the opposing jaw, thus leaving but scanty room for clasps. The teeth may be thick and stumpy, or long and thin, comparatively straight or narrow necked, loose or firm, decayed or sound. We cannot rigidly draw the line at perfectly sound teeth in our selection of a means of support, as such may not be at command. But we must discard those in a tender or aching condition, bearing in mind that however good a tooth is the using it as a support is not calculated to improve its condition.

On my use of the terms, bands clasps or clips, I would here offer a word of explanation. I have adopted these expressions more in a conventional than a real sense, and that simply because I find them to hand in dental nomenclature. I, however, hold the theory, that no fastenings for plates should be anything more than mere stays, and this is the sense in which I wish to be understood when I use the terms bands, &c.

Let us examine this question of the form of fastenings a little more closely, and in doing so we will take haphazard an upper molar band as it would be ordinarily made. Now, there are very few molars that are what we would call straight, as the crowns are invariably larger than the necks, and this, when the tooth is isolated is more apparent in the mesial and distal than in the lingual and labial surfaces. Now, a band in such a case would be made to envelope the entire tooth, excepting about one-third of its face, and in putting the denture in its place, would be sprung over the bulbous part of the crown, in order to get some sort of a fit in the tapering conformation of the neck.

Such an arrangement would not only hold a plate in place, and this it would do with a vengeance, but would in course of time produce discomfort in the tooth and eventually drag it out. For we must assume that a patient requires to remove the denture daily for purposes of cleansing. And

thus this operation becomes a mild form of wrench. Presuming that the band is otherwise well-fitted let us cut away those parts encroaching on the face, and the undercut on the mesial and distal surfaces of the neck, and we have left a gently staying support. The patient is able to remove such a denture without a cringe and without the slightest harm to the tooth. It is quite possible to adapt partial plate dentures, in many cases without any fastening medium beyond the mere accurate fitting of the substitute. So-called standard clasps, are, in my judgment, of questionable utility, as with such, more corners are available for secretions to lodge in contact with the tooth. The pressure also exerted in mastication invariably forces the gum between plate and tooth where the latter is left uncovered on the lingual surface. Thus the very evils sought to be averted or diminished, are increased.

The most objectionable, and inefficient fastening of all is undoubtedly the round wire band, and one is puzzled in these days of enlightened dental procedure, to find that there are still admirers of this old-fashioned and obsolete system.

The pivoting of roots is a sure and safe means of fixing a denture and where this operation is neatly effected, substantial support is got by the utilizing of otherwise useless remains of teeth. One good pivot may be estimated as worth two or three bands.

Some twenty years ago the profession in America introduced the system of supporting full and partial sets by forming ridges on their surface in contact with the mucous membrane. The original suggestion, I believe was that these ridges should be formed on each side of the palatal surface about one-third distant from the mesial line. But several modifications, and amplifications, have since been adopted. Some practitioners find a greater advantage is attained, in full uppers by forming this projection as a continuous line right round the outside of the alveolar border and across the palate immediately anterior to the junction of hard and soft palates, in some cases the vacuum chamber only is surrounded by the ridge. I have also seen the attempt made to apply the system to full shallow lower sets, but with what *raison d'être* it is difficult to conceive. The object of the introducer of this system seems to be, to get support by forming an artificial undercut which is produced by the ridge on the plate pressing into the soft tissue. This is another example of

heroic American dental practice, and is certainly ingenious, but I venture to say that the patients are few who will submit to the treatment. I have tried it in a modified form in my own practice but not with much advantage. I have probably shrunk from making the ridge sufficiently prominent, and to this I suppose I may attribute my want of success.

Whatever the difficulties may be in securing ample support for a denture where one or more teeth or roots remain, they are necessarily increased where the mouth is in an edentulous condition and such description of mouths form no small percentage of the cases that are presented for treatment, indeed we can say that sooner or later nearly all mouths lapse into this state. Whilst it is of no small importance to attain life-like appearance in the making, and arranging of teeth forming a full denture, it is of still greater importance that such denture should be of real practical utility to the wearer, and this it cannot be unless it is sufficiently stable to withstand the movements induced by the act of mastication.

It would be interesting to know even as a curiosity in dental mechanics when the thought first occurred to the dental mind to utilize the natural law of atmospheric pressure for the support of dentures, and who was the genius who first applied the principle of the spring for the same purpose. For with all our advancement in mechanical knowledge we are still dependent on one or the other of these systems.

We need not here waste time in attempting to describe the many disadvantages of springs even when they are mounted with the utmost care and according to the most approved method, as the practitioner who follows the lines of modern thought and experience, only adopts them as a last resort. It is rather our object here to point out certain exceptional cases where the use of springs may be considered imperatively necessary if not for general, at least for occasional purposes. Public speakers have probably more difficulties to contend with in the use of full dentures than men engaged in any other vocation. And this is especially the case with those who habitually engage in impassioned and rapid utterance. With such usage a suction denture, however skilfully adapted, is extremely liable to be jerked out of its place and a complete breakdown in the midst of an oratorical effort is not infrequently the result. Lord Brougham's teeth fell on the floor when he was addressing, as president, a meeting of the Social Science Association. Cuvier, the eminent French naturalist

whilst stooping to regain his teeth that had fallen out of his mouth whilst he was addressing the National Assembly, suffered an injury to his head from which he never recovered.

The jolting in the saddle whilst hunting, and steep mountain climbing are also apt to dislodge dentures. Patients advanced in years and of feeble nerve organisation, who have not previously worn substitutes, do not take kindly to suction dentures, such in fact do not seem to have the power to master the initial difficulties. In all such cases the necessity for duplicate sets is clearly indicated ; one of these being made with springs and the other without. The term suction as applied to full dentures is of mere relative meaning, for whilst it is a demonstrable fact in mechanics that two pieces of metal or other substance can be reduced to such near approach to planes that their surfaces will adhere, we must remember that the inferior and superior maxillæ cannot be converted into the condition of planes, and the inequality of surface we find in all cases, is rather inimical than otherwise to atmospheric cohesion. Then again, the material of which plates are constructed be it rubber or metal, is hard and rigid whilst the gums are soft and amenable to pressure, varying in degree in different parts of the same mouth. Lower dentures can only be expected to hold in their place by their own weight as in not one case in a thousand can the slightest approach to suction or anchorage be attained. Whilst weight in a lower is an advantage, the converse is the case with an upper, which should be as light as possible. As I have previously indicated the less an upper maxilla approximates to the condition of a of a plane, the less atmospheric adhesion is obtained and in deep vaulted mouths this is practically nil.

Four alternatives are suggested in dealing with edentulous cases. And these in their relative order of merit, are, plain suction plates, suction plates with the addition of vacuum chambers, suction plates with ridges, and plates held in place by springs.

All models for edentulous cases should be from impressions taken in plaster of Paris, as by such means alone can the fit desired be satisfactorily attained. The difficulty in securing lateral steadiness in full lowers may be overcome to some extent by carrying the plate well back on the inner parts of the alveolar border. As even to very flat cases some little prominence is usually found here. The support of an upper case may be materially assisted and this without injury to the

mouth by a vacuum chamber if it be properly constructed. It used to be the custom to form this chamber from a lead pattern, fitting it on the model, but I am now in the habit of placing a little dissolved plaster in its position, whilst setting, shaping it into a disc pattern, bevelling the edges slightly close round which, running a groove in the model with an excavator. In this way we get a simple and effective chamber. The fanciful formed chambers of shapes of hearts, shields and other designs are a feeble and misplaced ornamentation. Of the patent suction valves devices before the profession I can in no sense speak favourably. I have seen so much mischief arising from their use that I am inclined to be of opinion that a patient had better remain with bare gums than be compelled to wear such contrivances.

As the fastening of full dentures by means of ridges has been noticed in a previous connection, we may now pass on to examine the merits of spiral springs as a means of support. Anterior to the time of rubber work, I have mounted hundreds of sets of springs on the heavy tube dentures that were then in vogue, and am satisfied that great comfort was then afforded to the wearers of dentures so constructed. But the mounting of a set of springs 30 years ago was approached with a degree of care, deliberation, and nicety of mechanical manipulation, which scarcely pertains now, for the simple reason that they are passing rapidly out of date, as adjuncts of full plate dentures, comparatively few such being now made. The spring mountings, especially for vulcanite work—that is the bolts and eyes,—should be made of hard platina, and these should be mounted on a shouldered plate of the same metal so that any part of the spring coming in contact with the denture shall have a hard and unyielding surface to work against with the precision of clockwork. Such fittings should be attached to the plate after it is vulcanized, and after careful balancing. This may be done by suspending the case between the sharpened points of a pair of callipers, as in this way its exact equilibrium can be ascertained. If teeth have to be ground to keep the springs well in from the cheeks such should be used as will bear the highest polish, for a spring wearing against a roughened surface soon becomes useless.

I do not see any great difficulty in the way, of substituting for the ordinary wire spiral, a soft rubber spring which would cost but a few pence and could be easily replaced by the patient. I would commend this hint to manufacturers of dental goods.

As I have previously indicated, cases do occur where springs must be used, and it is incumbent upon us to so skillfully adapt these fittings as to make them in every sense comfortable to the wearer.

Gentlemen, I have drawn more upon your time than I originally intended, but the subject has grown upon me, and although I feel I have not done it that justice I would have liked, yet with all its imperfections I trust, the effort may in some slight degree further our knowledge on one of the most important departments of dental mechanical manipulation.

SUPPLEMENTAL NOTES ON NITROUS OXIDE.

BY J. OTTLEY ATKINSON, L.D.S., Eng.

THE feeling is one of satisfaction to myself that any contribution from my pen to the "Journal," should have elicited from so eminent an authority as Dr. Dudley Buxton, "Additional Notes on Nitrous Oxide," and it is with pleasure I endeavour to reply to his remarks and indicate where, I think, he has misunderstood me.

The question of the division, or otherwise, of the duties of administrator and operator will be dealt with in its proper places. How far my opinions and teaching differ from those held by Dr. Dudley Buxton and other London anæsthetists will afterwards appear.

Dr. Dudley Buxton commences by picturing to himself a state of things in the provincial dentist's surgery which, let us hope does not generally prevail. His arguments appear to be based on the erroneous assumption that it is the usual practice of country dentists to administer nitrous oxide in the absence of a third person; from what source he draws this inference I am unable to comprehend; nothing could be further from the truth so far as my knowledge extends.

It must be admitted, experienced gas anæsthetists are not numerous in the rural districts and their services are not readily available where this is the case it becomes one of the first duties of every provincial practitioner to qualify himself for his anæsthetic work.

I have never seen the gas administered without a third person being present, nor am I acquainted with any dentist who

would be foolish enough to do so. In my own practice, in all important cases there are never less than five persons present (without including the usual friend of the patient) of whom three are assistants thoroughly accustomed to their work and on the alert to every emergency. However skilful the operator may be a smaller number will hardly suffice to guard against every possibility of accident. Here, at least, there is no antagonism to the great principle of the division of labour. Where I differ from other anæsthetists is in the distribution and application of the various divisions and not in the principle. I am completely at one with Dr. Dudley Buxton in the warning (which he properly emphasises by repeating it three times) never to administer nitrous oxide without the presence of a third person ; this wholesome advice is not now, I am pleased to think, generally necessary to members of our profession.

The accidents that may happen from the breaking of gags ; forceps and other causes are too well known to need particularisation, it is sufficient to know they are real dangers and too great care cannot be taken to guard against them. In the early history of nitrous oxide, undoubtedly, troubles were experienced from the hallucinations of menstruating girls and hysterical women, and these troubles, I believe, are still occasionally encountered. Happily in recent years I have met with no such cases. I remain convinced these troubles arise from some defect in the administration, rather than from the temperaments of the patients. The use of nitrous oxide has enormously increased, yet we have fewer cases of this nature to record.

Regarding the division, or otherwise, of the duties of administrator and operator, I may premise these remarks for the purpose of being better understood, by repeating that in my own practice they are separated only for unusual cases, in all ordinary cases they are united ; advantages being claimed in favour of the latter method ; personally I have never known any disadvantage to arise from it. The mistake of permitting the operation to commence before the patient is completely 'under' has been pointed out. This mistake most dentists have experienced and made a note of. To prevent a recurrence the prudent operator prefers to have full control over the gas rather than place it in the hands of an anæsthetist who possibly may be unacquainted with the one great drawback of nitrous oxide.

It has been asserted the duties in question cannot be divided without seriously endangering the safety of the patient. This assertion I am not fully prepared to endorse. It must be first observed, unless the skilful operator, who undertakes the dual duties is in addition an experienced administrator all idea of combining the duties in the same person falls to the ground. Granted the possession of the double qualification the difficulties of the case disappear. The average dental surgeon is quite as likely to know what degree of narcotism his patient requires as a member of another profession who may, possibly, never have extracted a tooth. It must be further observed, the two duties are not concurrent, the operators beginning when the anæsthetist ends, his—the anæsthetist's—subsequent duties being efficiently discharged by assistants, who from practice are in complete accord with each other and the operator. One devoting himself to the mouth and head, another attending to the hands and arms, and another looking after the feet and otherwise making himself generally useful. The neglect of any one of these duties is to court a fiasco if nothing worse. It is anticipated that the professional anæsthetists, who may not possess the double qualification will look upon this teaching as heresy, but its success in practice and comparative immunity from accident, are the best evidence of its truth.

The most prominent question before the profession at the present time is not one of administration, but what is the most suitable for our purpose. It is here where the greatest divergency takes place. Each man advocating the cause of the anæsthetics he has been most successful with himself. One case from my own practice will illustrate this. Quite recently I was hastily summoned to meet a medical gentleman at the residence of a lady patient to extract sixteen or seventeen badly decayed teeth and roots; the doctor being a clever chloroformist, chloroform was the agent employed. The operation terminated successfully every way; I thought gas would have been safer and answered equally well, the doctor thought differently, and stoutly defended the cause of his favourite anæsthetic.

In most dental practices the great majority of gas cases consist of single or double extractions; in such cases the consensus of opinion is greatly in favour of nitrous oxide before all other agents; but occasions occur, more or less frequently, when it is desirable to remove a much larger number of teeth.

It is here the greatest divergency prevails as to the most suitable agent and the best methods for overcoming the difficulties of prolonged operations.

From the report of the meeting held at Brighton we find various opinions expressed, which need not be alluded to further than observing, that one or two gentlemen would accomplish their object by giving the gas, if necessary, two or three times at short intervals. I do not quite approve of this method and have never given the gas thrice in succession to any patient. Another gentleman would exhibit chloroform and extract all the teeth necessary at the same sitting, believing the patient has less to fear from 'shock' from one considerable operation than from a succession of smaller ones. With this gentleman I agree, but would substitute gas in place of chloroform. My own opinion is altogether in favour of gas for all dental operations requiring an anæsthetic. In the use of nitrous oxide long experience and concentrated attention alone ensure success.

The warning previously given in my paper may be repeated against the folly of making rash promises to patients or their friends. In dentistry, as in other things, "Nothing happens so often as the unexpected." Personally I am averse to the controversy, "So many men so many opinions." Discussion may have its uses, but permanent benefit can alone be derived from practical demonstration and long experience.

GENERAL ANÆSTHETICS.*

BY J. P. OLIVER.

MR. PRESIDENT AND GENTLEMEN,—The subject of my paper this evening is General Anæsthetics, but I propose confining my attention to those which are chiefly used in dentistry. Before, however, beginning the discussion of my paper, it will be interesting, I think, remembering what a large share dentists have had in the discovery and introduction of anæsthetics, to run briefly through the history of their discovery.

From the earliest ages man has sought for means of relief from pain. The Assyrians and ancient Chinese seem to have

*A paper read before the Students Society, London Dental Hospital.

employed various drugs for the purpose of blunting the sensibility of patients about to undergo an operation. Opium, Indian hemp, carbonic dioxide, and deadly nightshade were advocated to achieve this object.

In later days the Italian surgeons made their patients inhale vapours given off from a sponge moistened with warm water and steeped in a decoction of opium, deadly nightshade and hyoscyamus. After the conclusion of the operation the patient was aroused by inhalations of vinegar on a fresh sponge, or if this failed, traction on the ears was practised with good results.

As the knowledge of physicians increased, the heroic use of anæsthetics diminished, and at the close of the eighteenth century we find surgeons limiting their efforts to the moderate use of opiates, with recourse in certain cases to the effects of intoxication with brandy.

In 1774, James Moore, an English surgeon, suggested that compression of nerve trunks, by means of properly adjusted clamps, should be practised before cutting the limbs supplied by them, and John Hunter actually took advantage of this plan and amputated a leg in St. George's Hospital after compressing the crural and sciatic nerves.

The slow progress which anæsthetics had made, up to this time, was no doubt due to the rudimentary condition of chemical science. In 1772, Priestly discovered nitrous oxide gas, and Davy, in 1799, discovered, that it was capable of destroying physical pain: but this knowledge was not brought within the field of practical application until Horace Wells, an American practising dentistry, conceived the idea of using nitrous oxide as an anæsthetic for tooth extraction.

Wells went to a lecture on chemistry delivered by Dr. Colton, who during the evening amused the audience by exhibiting the properties of "laughing gas." He noted the fact, that one of the men, while under the influence of the gas, fell and severely bruised himself, but seemed to feel no pain. He resolved to try the experiment on himself, and the next morning got Dr. Colton to administer the gas while another dentist, a Mr. Riggs, extracted one of his molars.

After successfully employing gas among his own patients, Wells essayed to give a public demonstration in the operating theatre of Boston General Hospital, but something went wrong and the patient gave distinct signs of having felt pain. This failure seemed to have sealed the fate of

nitrous oxide. But Colton was not discouraged, and subsequently induced various dentists to try it.

In 1868, he came to England and successfully demonstrated at the Dental Hospital of London: a committee was at once appointed to inquire into its action, and an unanimous report in its favour was sent in.

The discovery of ether as an anæsthetic is also due to American enterprise, William T. G. Morton, a pupil of Horace Wells, experimented on himself with ether, and afterwards used it with success in extracting a tooth for a boy. He then administered it to a patient at the Massachusetts Hospital, and a tumour was removed without any pain being felt.

In England, the first administration of ether took place at the house of Mr. Robertson, a dentist, who extracted some teeth from a patient under its influence.

Sir James Simpson not being altogether satisfied with ether, made several experiments and found that chloroform possessed the anæsthetic properties of ether, without its unpleasant symptoms, viz.: harassing cough, headache, etc. Chloroform at once became exceedingly popular, and for a time completely eclipsed ether, and it was not until the dangers attending its use became known that the latter regained ground.

This, briefly, is the history of anæsthetics, and we see their discovery and introduction were in no small measure due to the energy and devotion of members of the dental profession.

Before we pass on to the consideration of any particular anæsthetic, it would be instructive, I think, to study the physiological effects of anæsthetics in general.

Anæsthesia consists essentially of the paralysis of the higher centres of the brain. It has been found that the germination of seeds may be arrested by the action of anæsthetics.

Now animals, like plants, are built up of microscopical cellular elements, but in the animal organism there is a greater degree of differentiation among the individual elements. We should expect that each of these cells would be affected in a different degree by the action of an anæsthetic, and we find this is so; certain cell groups are quickly paralysed, while others are capable of longer resistance.

The animal tissues which exhibit the highest degree of differentiation are the nerve cells of the cerebrum, and we find

the action of these is the first to be suspended during the progress of anæsthesia, sensation and volition are thus destroyed and the power of designing and controlling movement is lost. But the inhibitory action of the cerebrum on the centres in the cord is also destroyed so that we get increased reflex action.

As the progress of anæsthesia continues, these centres fall under its influence, and movement ceases, nothing remaining in action but the respiratory and cardiac centres. If these also cease to act, death ensues. But if this last stage be not arrived at the centres will recover their powers in exactly the inverse order to which they lost them.

We will now pass on to the consideration of the anæsthetic which has more particular interest to us as dental surgeons.

Nitrous oxide gas is a colourless body, which when pure is almost devoid of odour. It is capable like oxygen of supporting combustion ; at a pressure of 50 atmospheres at a temperature of 7 deg. C. it becomes liquified, and advantage is taken of this, as you all know, to store it. It is very soluble in water ; cold water dissolving its own bulk of the gas.

Nitrous oxide may be readily prepared by heating nitrate of ammonia in a glass or platinum retort. One pound of the salt will make 30 gallons of the gas. Care must be taken to heat the retort gradually, not so much for fear of breaking it, but because excessive heat would result in producing nitric oxide. This gas can be at once recognised by the red fumes formed on its coming in contact with the air in the wash bottles. The nitrous oxide is now passed through these wash bottles, the first contains water, the second a solution of ferrous sulphate, and the third a solution of caustic potash. It is then conveyed by tubes to the gasometer to be stored for future use.

Having briefly described the properties and preparation of the gas, I will pass on to its administration. It should be administered absolutely pure and free from air. The apparatus necessary being an inhaler provided with an air cushion that it may fit the patient's face accurately and thus prevent ingress of air. This is connected to an india-rubber bag which in its turn communicates with the gasometer or iron bottle in which the gas is stored.

During the early administration of nitrous oxide the face-piece was of a rather crude description and consisted merely of a glass tube which was placed in the patient's mouth, the nostrils being either clamped or held by the operator. Some

people advocate the use of a supplemental bag, which they claim is more economical and produces longer anæsthesia ; the disadvantages are : that it is liable to produce headache, and with its use the patient takes longer to get off. Should we ever wish to make use of a supplemental bag, it can be easily managed without a special apparatus by placing the finger on the expiratory valve of the face piece and so causing the patient to expire back into the Cattlin bag.

We now come to the administration of the gas. The patient's mouth should first be examined to see that there are no artificial plates, loose pivots, etc., which would be in danger of being swallowed during the administration of the anæsthetic.

Precaution should be taken to loosen any tight collars or belts, so as to give every opportunity for free and easy respiration. The next step is to keep the patient's mouth open by means of a gag, which must be placed in the opposite side of the mouth to that on which the operation is to take place ; or, if both sides are to be operated on the gag will have to be placed between the front teeth. An adjustable gag should always be ready in case the other one should slip during the administration of the gas.

Various kinds of gags are used ; some are made of vulcanised rubber, some more complicated called ("spring gags") certainly have the advantage of slipping less than the others, but there is always a danger of their breaking ; corks are also sometimes used, but they are liable to be crushed up, and cannot, therefore, be relied upon. Gags should never be used singly, but attached by means of strong fishing gut or silk to another one, so that there may be no danger of their dropping down the patient's throat.

The gag having been firmly placed the face-piece is applied and the patient told to breathe freely. It is as well not to connect the face-piece suddenly with the Cattlin bag, but to allow the patient to breathe air the first two or three seconds until he has become accustomed to the apparatus ; the connection can then be turned on. As the patient gets under the influence of the gas the following phenomena may be noticed : After about fifteen seconds the face, ears, and tips of fingers assume a dusky hue, but the patient is still conscious ; in thirty seconds consciousness is lost, but if the face-piece be removed the patient will rapidly recover, and in a minute from the commencement of the administration, reflex action

is entirely lost ; the conjunctiva is insensible to touch ; if the inhalation be still continued, the breathing becomes stertorous, muscular movements of the hands and feet usually take place, the eyeballs oscillate, and the breathing becomes slow and intermittent. It is not safe to press the administration further than this point.

The laryngeal stertor of the last two or three inspirations must not be confounded with "snoring" or palatine stertor, which may continue throughout the administration, true laryngeal stertor never commences until after at least a minute, and is caused by the vibration of the aryteno-epiglottidæan folds.

Anæsthesia is generally complete in about 80 seconds after the commencement of the administration, and lasts for 30 seconds. Absence of sensitiveness of the cornea to touch, and stertor, are the most reliable signs that this stage is reached. Nitrous Oxide exercises but a very slight depressing effect on the heart. In animals killed by it, the heart was found to continue beating after respiration had ceased. Its physiological action does not seem yet to be quite clear. Until lately it was supposed to have acted by producing partial asphyxia ; but that it must also have some special effect on the nerve-centre analogous to chloroform and ether seems to be proved by the experiments lately carried out by Dr. Hewitt at this hospital, who administered a mixture consisting of Nitrous Oxide with 12 per cent. of Oxygen and found that he got deep anæsthesia, without the loss of colour and stertor, which occur during the administration of Nitrous Oxide alone. Unfortunately he found that this mixture could not be relied upon in all cases ; some patients becoming very excited under its influence ; the excitement subsided however on the addition of more Nitrous Oxide. This of course renders a special apparatus for mixing the gases necessary. The following advantages over Nitrous Oxide are claimed for the mixture :

- (a) More pleasant to inhale.
- (b) Absence of loss of colour and stertor.
- (c) Longer Anæsthesia.
- (d) No unpleasant after-effects.
- (e) Absolutely safe.

In the absence of stertor and other signs of Nitrous Oxide anæsthesia it is very difficult in giving the mixture to know when to remove the face-piece.

The most reliable signs appear to be :—Relaxation of the extremities, and calm respiration, the patient appearing to be quietly asleep.

It takes a much longer time to produce anæsthesia with the mixture, than with pure nitrous oxide, and this is I think, an objection to its use, especially in hospital practice. The cases in which its use seems more especially indicated are those in which the functions of the heart or lungs are severely impaired, and when it is desirable to throw as little extra strain as possible upon these organs.

During the administration of the gas there are always certain sources of danger open, which it would be well for us to discuss so that should they occur we shall be ready to meet them.

Although syncope never occurs under nitrous oxide, less severe forms of heart failure, such as faintness, do sometimes occur. The patient should be placed flat on the floor, smelling salts, slapping face with wet towel and other means should be used for restoring animation. If these should fail a few whiffs of Nitrite of Amyl will soon have the desired effect.

In some cases the breathing may become very shallow and even stop. If it cease for more than six seconds, artificial respiration must be resorted to, and is always found successful.

The chief dangers of nitrous oxide administration are due to foreign bodies, such as teeth, stumps, broken instruments and falling into the back of the mouth and being sucked into the larynx by a sudden inspiration.

To guard against these accidents the operator should be careful, that each stump is removed from the mouth before the extraction of another is attempted.

Should a stump slip from the forceps into the back of the mouth, the patient's head must be immediately thrown forwards, and the finger swept round the base of the tongue and thus prevent it falling into the larynx.

If, in spite of all our efforts, it be sucked into the larynx, the following alarming symptoms will be noticed. The patient will be seized with a violent spasmodic cough and difficulty of breathing, which is sometimes so great that danger from suffocation is imminent. Under these circumstances tracheotomy must at once be resorted to. If, however, the symptoms are not urgent, the patient must be put to bed and kept under the influence of narcotics, so as to lull the vigilance of the

muscles which guard the aperture of the glottis ; the foreign substance may then become coated with mucous and expectorated during an effort at coughing or vomiting.

It sometimes happens that we want a longer period of anæsthesia than can possibly be obtained by nitrous oxide alone, it then becomes necessary to use some other anæsthetic.

Ether and chloroform are both used, each anæsthetic having its advocates, but the former on account of its greater safety is the favourite. The relative rates of mortality of the two being

Chloroform	-	-	1 in 3000 cases
Ether	-	-	1 in 23000 cases

Ether vapour must be administered undiluted, it is very often used in combination with nitrous oxide, the gas being used to produce anæsthesia, and ether to prolong it. This method is the one generally used in dental operations, and it spares the patient the disagreeable smell and taste which accompany the use of ether only.

When ether is administered alone considerable irritation of the larynx usually takes place producing a troublesome cough and feeling of suffocation, this causes the patient to resist the administration ; so that the initial stage of etherisation is one which requires considerable skill and tact on the part of the administrator.

One great objection to the use of ether in dentistry is the excessive flow of saliva which it induces, another is the nausea and vomiting which it so often causes, this last may, however, be in a great measure prevented by carefully sponging out of the mouth, during the operation all blood and mucous, the swallowing of which is almost certain to act as an emetic.

In administering ether the breathing should be carefully watched, as it sometimes become very shallow, and may even stop. This, fortunately occurs some seconds before the heart ceases to beat, so that artificial respiration may be resorted to with every chance of success.

Ether cannot be used in operations needing the employment of the actual cautery, and should not be used for patients suffering with bronchitis, emphysema, or Bright's disease. If for any of the above reasons the use of ether is prohibited, we shall have to fall back on chloroform or one of the anæsthetic mixtures. Chloroform must be administered freely diluted with air not more the 4 per cent. of chloroform vapour ought to be present. The phenomena of anæsthesia

somewhat resemble that of ether, but there is an absence of the harassing cough in the first stage, and the patient falls under the influence of the drug much more rapidly.

Its physiological action on the heart differs from that of ether, as it has a depressing effect, and it is in this that the chief objection to the use of chloroform lies. In using this anæsthetic, therefore, we must be very careful to watch the pulse, and the moment it shows signs of failing the administration must be stopped. Failure of the heart may occur quite at the commencement of the administration, or in the third stage. In the first stage syncope has been attributed to reflex inhibition of heart due to terror, shock, &c. So that it is important that no operation, however trivial, should be commenced until the patient is completely under the influence of the anæsthetic.

On the first signs of syncope the patient must be placed with the head at a lower level than the feet, and while in this position artificial respiration by Sylvester's method should be kept up. Nitrite of Amyl, dashing cold water on face, and electrical stimulation of the heart, will all be found useful in assisting recovery. The dangers attendant on the administration of chloroform have suggested the use of various mixtures in the hope of diminishing the perils of anæsthesia from that agent. The A. C. E. mixture consisting of, one part of alcohol, two of chloroform, and three of ether has been largely used in England.

The advantages connected with the use of these alcoholic and ethereal dilutions of chloroform, consist in a more perfectly sustained action of the heart and respiratory centre.

The disadvantages consist in an irregular rate of evaporation, and hence it is impossible to be quite sure what percentage vapour of chloroform is being inhaled. The occurrence of several fatal cases under the use of these mixtures is a sufficient demonstration that they are not devoid of danger. And now, gentleman, I think I have touched on all the anæsthetics most commonly used in dental operations, and will therefore close my paper thanking you for your kind attention, and hoping you will excuse its many shortcomings.

AN ADDRESS ON ANÆSTHETICS.*

BY DUDLEY W. BUXTON, M.D., B.S.

Member of the Royal College of Physicians, Administrator of Anæsthetics in University College Hospital, the Hospital for Women, Soho Square, and Assistant Anæsthetist to the London Dental Hospital.

AFTER some general remarks Dr. Dudley Buxton said there were some points upon which it might not be uninteresting to enlarge.

In reference to the preparation of a patient preliminary to operation, it was in the case of Nitrous Oxide Gas necessary to ensure that the patient was able to make full use of his breathing capacity. Simply loosening the upper portion of the dress is insufficient, although a wise procedure, since when the head is fully extended upon the trunk the neck is apt to become constricted by bands, collars, etc. As a rule it is easy to detect by the shape of the chest whether unduly tight clothing is worn, and if there be any suspicion of such a state of things a simple and expeditious test should be applied. The hands should be placed lightly upon the neck just below the collar bones and the patient instructed to take a deep breath. The hands should then be placed lightly upon the sides, just above the hips, and the patient again instructed to breathe deeply. If the corsets are too tight the amount of movement will be very slight, and then it is unnecessary to go through all this in every case, and here, as elsewhere, the administrator of the anæsthetic must rely upon his common-sense and judgment. The necessity for attention to these preliminaries has been brought forcibly home to us all by the recent fatality in Edinburgh where a lady, aged 71, was so tightly laced that when under the influence of nitrous oxide gas she ceased to breathe, and as she was the subject of extensive heart disease, her life was lost through cardiac failure, consequent, I have no doubt, to the hampering of her breathing induced by tight laces and a distended stomach.

When these preliminaries have been adjusted it is important to see that the apparatus is most favourable as regards the patient's safety and comfort. I prefer Clover's methods

*Delivered before the Students' Society, London School of Dental Surgery.

to any I have yet seen, and always employ them. I think one cannot insist too strongly upon the necessity for an effectual expiration valve. The importance of this is determined by the necessity there is to abolish any asphyxial phenomena from nitrous oxide narcosis. Rebreathing exhaled air, or gas means taking back into the lungs and pulmonary circulation the poisonous refuse exhaled from the epithelium of the respiratory tract. Careful experience also has shown that even thoroughly purified air, which has once been breathed, is deleterious when rebreathed, and is, moreover, incapable of supporting life. This, then, is a further, and an additional reason why once breathed gas should be got rid of by a free expiration valve and not rebreathed. If what I have said is understood, it will be readily seen why I have so strong an objection to supplemental bags, and have so persistently decried their use.

Another important part of the apparatus consists of the gags, or as I prefer to call them "props." The mechanical gags, such as Buck's, are theoretically good, but are dangerous in practice from their liability to break, besides they get tooth indented and look dirty. In dental practice not only must all appliances *be* scrupulously clean but they must *look* clean. More than one almost fatal and even fatal result has followed breaking of spring gags.

During the administration it is not only essential that the anæsthetist should fulfil his duties efficiently, but it is as important for the patient to carry out the anæsthetist's instructions. Experience has taught me that it is far more efficacious to show a patient what to do, than simply to explain what you wish him to do. For instance, if you tell a patient to breathe deeply, he almost invariably takes a prolonged inspiration, and then holds his breath with the utmost pertinacity, and naturally complains, in the sequel, of feeling suffocated, since the narcosis is that mixed form not inappropriately called "nitrous oxide and asphyxial narcosis." On the other hand, if you tell him to blow out with all his might, or as Mr. Clover was in the habit of saying, "Blow as if you were blowing upon a looking glass," he will obey and expire deeply, and in spite of himself will inspire just as deeply, for by voluntary effort we can hold our breath, but by no voluntary effort can we maintain the chest empty.

Upon the subject of the "mixed anæsthesia" of "nitrous oxide and asphyxia," I may say that I am

surprised that any student of this hospital should make the statement that we do not know much about the physiological action of Nitrous Oxide gas ! I venture to think that we know more about the physiological action of this agent than we do about any of the others, for the reasons I am about to state. And again I join issue with Mr. Oliver when he tells us that we have learnt nothing about the physiological action of the gas from the recent trials which have been made at our hospital of mixtures of oxygen and nitrous oxide. *Palmam qui meruit ferat*, let him wear the palm who has earned the prize. The great merit which belongs to my colleague Dr. Hewitt, lies in the painstaking and ingenious way in which he has striven to place in the range of practical anæsthetics the mixture of oxygen and nitrous oxide, but we must not forget that to one of the most original of French scientists of the past generation—M. Paul Bert, belongs, the suggestion of employing nitrous oxide and oxygen, and the method is universally called after his name, Bert's method. To Bert we owe one great proof that nitrous oxide acts as a pure anæsthetic and not as an asphyxiant, for it was he who demonstrated that when given under pressure (true atmospheric pressure) with oxygen, the vital processes were carried on uninterruptedly even for over an hour of continuous inhalation. This took place ten years ago last July. Now as to the physiological action of nitrous oxide. Mr. Oliver does not appear to be aware that within the last ten years some rather elaborate and accurate researches have been undertaken which have shown, I think I may say, conclusively that—

1. Nitrous Oxide acts as such, and that asphyxia does not in anyway play a part in producing narcosis. Animals killed by asphyxiation evince evidence of suffering almost up to the last gasp, while those who die under nitrous oxide die absolutely insensient and unconscious. This fact has curiously enough been entirely overlooked by recent writers upon Asphyxia.

2. Nitrous Oxide possesses a specific action upon the cerebro spinal axis, producing well-marked vasomotorial changes leading to considerable increase in the bulk of the hemispheres and cord and developing interstitial pressure upon the cerebral and spinal tissues which determines narcosis. I may not however linger further, as those who desire, can, by reference to the transactions of the Odontological Society for 1886 and '87, find the subject fully treated in two papers I contributed.

Before leaving the subject of the mixture of oxygen and nitrous oxide, I must add a word of caution. We are not at present in a position to say how far it is safe to admit of continued inhalation of oxygen, and from the experience we have gained of its use in therapeutics, we are bound to admit it is not free from danger, owing to the excessive oxidation it gives rise to.

The completion of nitrous oxide anæsthesia is according to the reader of the paper, told by the loss of conjunctival reflex. I think this sign is too uncertain to be deemed reliable, stertor and commencing jactitation, are, in my experience, the only truly reliable signs of unconsciousness.

But who are to be the administrators of nitrous oxide? It is unfortunately the fact that as the law at present stands, no one is debarred from giving any anæsthetic, provided it is not done with an evil intent. Just as the law does not interdict anyone from practising as a doctor or dentist, provided he does not assume a title which would induce the public to believe him to be a registered practitioner, so it does not discountenance any one from administering nitrous oxide. Of course, under various Acts the patient, or his friends could recover damages for injuries incurred through the maladministration of an anæsthetic, but it goes no further. However, there is very little doubt that at the present day it would go very hard with anyone who had a death if the administrator were not a qualified or registered practitioner, as a qualification is presumptive evidence that the incumbent knows something about nitrous oxide administration.

Speaking of death and dangers of anæsthetics, I should like to draw attention to the importance of total inversion in the treatment of syncope occurring under an anæsthetic, and my remarks apply with equal force to cardiac failure under gas, and in the *first* or *second* stage of chloroform or ether narcosis. Nélaton was the first who insisted upon the value of inversion in chloroform faintness, and the method is called after his name. I have had some cases at the Dental Hospital which have strikingly exemplified the value of the manœuvre, cases in which faintness occurred, and alarming failure of the heart, and respiration stopped at the end of the operation and before any return to consciousness had taken place. I inverted, letting the head hang and raising the heels in the air, and at once the colour returned and all faintness passed off. This manœuvre can be executed without any indelicacy or difficulty. In most of the dental chairs, arrangements exist

by which the head can be lowered beneath the level of the heels, and this aids the process of inversion which may, or may not be completed by raising the heels according as the patient shows signs of recovery or not.

There has long been a mistaken idea in the minds of persons not conversant with the more modern and better methods of administering ether that persons take longer to become unconscious under ether than under chloroform, whereas the opposite is the case, the average time of etherisation being in my hands two minutes, or when gas is used as a preliminary one minute and a half, while chloroformisation cannot safely be achieved in less than from five to eight minutes. I spoke just now of the value of inversion as a treatment for chloroform syncope, it is necessary therefore, that I should point out that discrimination in selecting the cases must be employed. In the first stage of chloroformisation, so-called reflex syncope may occur, not only from fright, shock (imperfect anæsthesia) but also, as the experiments of Browne-Séquard, and others have shown, from the impinging of a too strong vapour upon the posterior pharyngeal wall, and so starting inhibiting action upon the heart through the pharyngeal plexus. It is in all these cases that inversion is most useful. When, however, syncope occurs as the result of cessation of respiration, when the lungs are engorged, and the right heart over-filled with blood, when, in short, asphyxia precedes heart failure, inversion is not to be practised, as it would only pour more blood into the already filled heart, and still further increase the difficulties of an organ already hampered.

There is much more I might say upon this subject, but as Nitrous Oxide is of greater interest to you than the alcohol series of anæsthetics, I have preferred to enlarge upon that, and cannot any longer monopolise your time and keep others from addressing you.

MR. MORTON SMALE, Dean of the Faculty in the London School of Dental Surgery, has been appointed fourth examiner on the Dental Board of the Royal College of Surgeons of England. This appointment now makes the Dental Board on a parity with the Surgical, supplying one examiner and one marker to each table, and so removes what has for some time been regarded as a most undesirable anomaly in the carrying out of the examination for the L.D.S. at the College of Surgeons of England.

Reflections from the Surgery.

ACCIDENTAL REMOVAL OF A FIRST BICUSPID (LOWER) WHEN EXTRACTING A TEMPORARY FIRST MOLAR.

Replantation, Treatment, Result.
(Under the care of Mr. G. E. Rogers.)

ON the 28th June, 1870, John Coles, a boy aged eleven years, was brought by his mother to the general dispensary in Birmingham; he complained of severe pain in the vicinity of the first molar in the lower jaw.

On examination, by percussion, it was clearly shown that the pain proceeded from the roots or socket of the first temporary molar; there were no diseased teeth in the boy's mouth, no exudation of pus from the gums, nor any sign of disease in the offending tooth.

I requested the boy to call again, but he was determined to have the tooth extracted as he had been awake several nights and was kept away from school. It being the temporary tooth I had no hesitation in complying with his wishes. I therefore operated, and was greatly surprised to find that I had brought away with the molar the crown of the first bicuspid.

I quickly made up my mind to replant the bicuspid, so taking a pair of bone-cutting forceps I freed the crown from the roots of the molar and placed the bicuspid in water of a blood heat. Then carefully washing out the socket to free it of clots I transferred the bicuspid with my fingers not daring to use a forceps for reasons which I will explain in another paragraph.

Having replaced the tooth I applied a plug of cotton wool saturated with a solution of hyd. perchlor. 1 to 600.

The crown of the bicuspid was on a level with the gum. I explained to the mother the nature of the case, told her how necessary it was that a new plug should be placed over the crown at least after each meal and the mouth kept closed by a four tailed bandage, two of these I gave her after seeing that she could apply them properly. For diet I directed her to give him good soup and milk with bread. She took with her a

small phial of the solution and promised to return in four days if there was nothing to cause her coming sooner.

On the 3rd July the boy came again. I found everything going on well, but told him to keep the bandages on for two days more and to keep the plug on. I took an impression of the lower jaw, directed the boy to come with his mother at the end of that time, which he did. I then placed a cap over the second permanent molar and the temporary canine—this cap was made of aluminium plate, at the end of a fortnight the cap was removed, the tooth showing well above the gum and quite firm.

I will now describe the state of the crown and roots of the molar and its captive bicuspid.

The crown of molar was well developed having no sign of decay, the roots shewed no sign of absorption, were very broad and closely embraced the crown of the bicuspid, which was of a beautifully pearly colour, and was the only portion of the bicuspid which was calcified the roots being in a gelatinous state. Fearing the crowns would be injured if grasped by a forceps was the reason why I used my fingers in the replantation.

DR. A. H. THOMPSON says, that it is a very erroneous impression to suppose that cement will not be durable under porcelain inlays. If the piece is accurately ground, the crevice is so very small, and the cement clings so tenaciously to the tooth substance, the moisture cannot penetrate, even at the margin of the gums. In its preserving properties it is absolutely superior to any other filling material.

BURNS AND HOW TO ALLAY THE PAIN.—Equal parts of Tannin and alcohol mixed with 48 times as much sulphuric ether is said to make a useful application, but perhaps a better one is formed by adding Salol one part to every twelve parts of the old carron oil (equal parts of Limewater and olive oil.)

British Journal of Dental Science.

LONDON, NOVEMBER 1st, 1889.

DEATHS UNDER ANÆSTHETICS.

THE death of Lady Milne at Edinburgh, the narrative of which we published in our last issue, has given rise to a great deal of comment and unjust criticism of nitrous oxide as an anæsthetic. There is a very great difference between a death occurring under an anæsthetic, and a fatality following directly as the result of the anæsthetic, and in the Edinburgh case this important difference is brought out into very bold relief. A lady, aged 71, described as looking somewhat unhealthy and flabby, is oppressed by nervous apprehension, and even goes so far as to tell her daughter that the visit to the dentist will be the death of her, comes to have gas administered dressed in such tight fitting clothing that she cannot breathe without difficulty, and to add to these she has a stomach distended with undigested food ; under these circumstances the wonder would rather be if death had not ensued, than that Lady Milne died. With fatty degeneration of the heart syncope is of course an always possible occurrence, and the fact that a person is unable to breathe with normal fulness and that the thoracic movements are in any way hampered must greatly enhance the danger of heart failure. We regret that the daily press should have got hold of the case in point, firstly, because its utterances on scientific matters are almost invariably inaccurate, unreliable and only too often inspired by personal favour or gain-getting ; and secondly, because in these days of hurry and superficiality men are only too apt to accept with unquestioning credulity the statements made

by their matutinal penny oracle. In this instance no exception has occurred, and the nonprofessional papers have mostly indulged in platitudes and alarmist paragraphs only too calculated to shake the confidence of the public in a useful anæsthetic, if not to promote doubtful substitutes. Apropos of these latter, we have received an amusing notification, that we are at liberty to publish what a correspondent calls "a Yankee notion" for the promotion of Anæsthesia by "Vitalized Air." Our correspondent's name and address are written large, but lest we should hurt his modesty by inducing crowds of aspirants after "vitalized air" anæsthesia, we refrain from giving them publicity; we might add for his private ear that "vitalized air" has been exploited a long time ago, and has even been exploded, and the charlatan who thought to rob the public by giving them an old remedy under a new name, has met with the fate which such gentry most richly deserve. Anæsthetics are many, but safe ones are few. Further, even the safest may be converted into the most lethal by carelessness and lack of precaution upon the part of administrator or even the patient. It is a great pity that the public is so ill-informed concerning anæsthetics, but probably it arises from the fact that medical men, from whom they derive most of their facts of a medical character and opinions, are themselves poorly versed in the history, physiological action, and methods of administration of anæsthetics.

OPINION OF THE MEDICAL PRESS UPON THE DEATH UNDER NITROUS OXIDE.—The *Lancet* says:—The record of so unusual an event as a fatality under this anæsthetic has, through the medium of the daily press, received a widespread circulation, and has produced much alarm and dread of the gas. Now that the facts are fully known, it becomes our duty to allay what at best are groundless fears, and to remove the slur which rests upon nitrous oxide gas, as well as reiterate that we believe nitrous oxide to be practically without danger if only patients, as well as administrators of the gas, would take a few simple

precautions. The patient whose sad death we recorded in a preceding issue was seventy-one years of age, she was suffering from advanced fatty degeneration of the heart, and was fully aware of her condition. Although she breakfasted at nine in the morning, and the teeth were not removed until noon, digestion appears to have been wholly suspended by the intense terror she experienced at the thought of submitting to the operation. She repeatedly told her daughter that she "knew she would not survive the operation." Added to the full stomach, and the extreme apprehension, both conditions liable to tell against even a healthy, much more a fatty heart, the patient wore very tight corsets, so tightly indeed was she laced that it was found difficult to remove the stays even by slitting up the laces with a knife. Although it would appear the dentist warned the patient to loosen whatever she had on which was tight, she merely loosened the neck wraps, leaving the more important corsets tightly laced. As soon as nitrous oxide was commenced to be inhaled, the dentist noticed that respiration was insufficient, and urged deeper inspiration. Doubtless this weak breathing was due to the tightness of the clothing. When eventually the patient became unconscious, two teeth were removed and a hole drilled into the antrum, giving vent to pent-up secretion. Then the patient suddenly changed colour, became livid, while respiration and heart action ceased, it is believed, simultaneously. During the subsequent performance of artificial respiration the undigested contents of the stomach were voided. There seems little doubt in this case that the impairment of respiration from tight lacing—distension of the stomach—told upon a heart itself badly diseased and weakened by the fear to which the patient had given way, and the most melancholy result followed. There can be no question that when any known degeneration of the heart muscle exist that the recumbent or semi-recumbent posture should be adopted, as can easily be accomplished in a dental chair, and corsets removed and all waistbands and strings undone. Where fear exists in the patient's mind, it is important to avoid a full stomach ; a cup of beef-tea or a basin

of bread-and-milk should form the meal preceding the operation. Reviewing all the circumstances of this most sad fatality, there is, we think, no reason for going back from the position which modern anæsthetists have occupied, that nitrous oxide is not only the safest anæsthetic we possess, but that when it is circumspectly given it is practically free from danger, save in cases of very advanced disease of the heart or lungs.

The British Medical Journal says :—Our Edinburgh Correspondent last week drew attention to a death which took place in the operating room of a dentist after the administration of nitrous oxide. The occurrence is fortunately very rare but it seems advisable to ask whether this anæsthetic is as safe as it is usually considered to be. The patient, Lady Milne, was a woman aged 71, of stout build, and under treatment for fatty degeneration of the heart. She had been referred to the dentist by her medical man, in order to have two teeth removed and an opening made into the antrum. It appears that Lady Milne very much dreaded the operation, and was heard to remark she feared she would not survive it. At 9 A.M. she breakfasted, but it seems her food remained wholly undigested, for during the performance of artificial respiration, undertaken when breathing ceased, it was ejected unchanged. The operation took place at noon. The dentist noticed whilst he gave the gas that Lady Milne breathed very shallowly, and he begged her to inspire more forcibly, but this she failed to do, for, as was afterwards discovered, her corsets and clothing were so tightly bound round her that normal breathing was simply impossible. As soon as consciousness had gone the teeth were extracted and the antrum perforated. It was then observed by the dentist and his assistant that Lady Milne had become livid, had ceased to breathe, and her heart had stopped beating. Although artificial respiration was resorted to, the tongue being drawn forward, while the stays were with difficulty slit up with a knife, and nitrite of amyl exhibited, she never showed signs of life. Medical aid was promptly summoned, but in vain.

That nitrous oxide will be blamed is certain, but a dispassionate consideration of the circumstances seems to point rather to the neglect of precaution on the part of the patient than to any particular danger from the anæsthetic. It is clear Lady Milne died from mechanical rather than from poisonous agency. Persons, even with fatty heart, although of course they are the least adapted for any kind of anæsthetic, take nitrous oxide with impunity ; but the recumbent posture, with absolutely loose clothing and a stomach not distended with gases and undigested food, are conditions which can hardly be omitted without grave risk. The dentist who gave Lady Milne gas seems to have regarded her statement about her weak heart as merely the expression of a highly nervous woman, but we cannot but think it is wise in all such cases to give the patient the benefit of the doubt, and adopt the precautions to which we have above alluded.

EXPERIMENTAL WORK AT THE COLLEGE OF SURGEONS, LINCOLN'S INN FIELDS.—Our readers may not be aware that there are attached to the College of Surgeons rooms set apart for the purpose of carrying on experimental research. No fee is charged, and every facility is offered to those who desire to prosecute research work. An embargo at the present exists upon vivisectional work as the laboratory is not licensed for experiments carried on upon animals scheduled in the Vivisection Act. Not only will Fellows and Members of the College be welcomed, but Licentiates in Dentistry will find no difficulty in their way should they desire to employ the facilities thus offered for research work. There are so many matters of great interest connected with dentistry which need elucidation by research, that we trust dentists will not be backward in making use of the experimental rooms at Lincoln's Inn Fields. For researches requiring vivisection methods there will shortly be opened rooms on the Embankment by the new Examination Hall for their prosecution, and we understand that every effort which good management and a far seeing policy can ensure will be made to facilitate experimental research.

THE LIBRARY OF THE ROYAL COLLEGE OF SURGEONS.—The Council have determined upon an experimental opening of the Library of the Royal College of Surgeons of England in the evening of each day of the week, except Saturday, up to the hour of 9 p.m. This order will be continued for three months, and if the number of persons availing themselves of this extension of time seems sufficient to warrant the expenditure incurred by employing the College servants as well as for lighting and heating, the evening opening will be continued. As there must be a great number of our readers who will regard this extension of hours as a great boon, we trust they will use every endeavour to obtain a permanent arrangement for opening the library in the evening.

ETCHING LIQUID FOR STEEL is made by mixing 1 ounce of sulphate of copper, $\frac{1}{4}$ ounce of alum, and $\frac{1}{2}$ teaspoonful of salt reduced to powder, with 1 gill of vinegar and 20 drops of nitric acid. This liquid may be used either for eating deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act.

ADAPTATION OF PORCELAIN TEETH.—Dr. Thomas, Des Moines, according to an exchange, allows his porcelain inlays to project considerably from the outline of the tooth until the cement has thoroughly hardened. He then grinds it to the proper contour and polishes. He says that at the distance of three feet from the patient his fillings cannot be detected, if of the proper colour. This is the most difficult point to attain. If there must be any difference, let the filling be darker than the tooth, rather than *vice versa*.

PORCELAIN FOR TEETH SENSITIVE TO THERMAL CHANGES.—Teeth that have been intolerably sensitive to thermal changes under gold fillings are found to be perfectly comfortable with porcelain inlays.

Abstracts of British & Foreign Journals.

INTERNATIONAL DENTAL JOURNAL.

THOROUGHNESS.

By WM. H. ATKINSON, M.D., New York City.

THE object of thoroughness is to have work well done. Work, to be well done, must conform to the necessities of plan as basis of purpose of the performance, of whatever sort it be. Thoroughness of preparatory knowledge makes thoroughness of effort possible, and thoroughness of effort makes possible a result thorough in its conception, preparation, and execution. Enough is contained in any modern college curriculum to eminently fit the graduate for active useful life, were it thoroughly taught and thoroughly learned. Too much effort is partly wasted in the attempt to teach large numbers. Too much stress is placed upon the personality of the instructor, and too little thoroughness is demanded of the student in taking each step as he mounts, and the widespread attention a large class demands, precludes that individual constant notice which is vital to a comprehensive grasp by the student of the inception, progress, contemporaneous condition, and *modus operandi* of any department of human effort. To be thorough in effort there must have been thoroughness in preparation. A clear conception of the conditions presenting necessarily precedes a proper or thorough ability to deal with such conditions. Thorough grasp of the work of others, whether such work was thorough or not, aids greatly in laying out effort. Thoroughness is a quality mostly of inheritance, but may also be cultivated in those naturally negligent and loose in their modes of investigation and execution. The mass of pupils under instructors (private and in colleges) are more desirous of meeting the views of their teachers so as to pass with high marks and get their degrees than to thoroughly comprehend the teaching satisfactorily to their own understanding, which would be more effective in gaining them those high marks than any abject copying of formulæ and special interpretation, supposed to be in favour with their instructors. This simply means that the desire to pass the examinations

and be recognized as in possession of knowledge is a much stronger instinct than to possess the knowledge and have recognition deferred to a later date. Thoroughness is the prerequisite of rapid and permanent growth in every department of human life, and as a comprehension of the rise of dentistry—what it has been, what it is, and what we hope to make it—involves knowledge of science, art, and execution, we must possess all these and hold them in a tentative readiness to be applied whenever the occasion arises in which their application will thoroughly complete the work in hand. As it is not the prerogative of any individual to be thus endowed, it is a great satisfaction to us to know that there is the ability somewhere among us, the correlation aggregation and application of which will make us adequate to the new demand. As former steps or stages of progress in our calling have so eminently proved to the benefit of mankind, by better interpretation and more thorough comprehension of the principles involved than former times have shown to be possible to men devoted even to special departments that should have fitted them for apprehension, and comprehension of the advances of scientific attainment on a sure ratiocinative basis. Science scorns empiricism, and yet owes to it many facts that the inspiration of empirics led it to investigate. Old women's remedies have cured many diseases, and modern medicine is much in the dark as to the facts of the operation of drugs on the human system. Because a certain drug has been said to be of service in a certain complication, that drug has come to be accepted as the one to be exhibited. Any well-laid plan of procedure, thoroughly carried out by earnest and fraternal co-workers, must succeed in the ratio of the persistence with which it is pursued. Clinical instruction was inaugurated under the sense of the need among our fraternity for its practical demonstrations. To it more than to any other single means do we owe our unprecedented advancement. Although our clinics as now held are immeasurably better than none, still much might be done to increase the benefits of such efforts. The writer thinks each section of a certain population should unite their local societies into a general body, and make a permanent home in a central town where quarterly or semi-annual or more frequent meetings could be held. Such home to have connected with it a spacious laboratory and operating-rooms, the latter of which could be utilized for meetings, and the operating apparatus stored for the time

being in the laboratory. These rooms to be fitted with sufficient engines, chairs, stools, stands, impression-cups, forceps, and electrical connections or batteries, furnaces, vulcanizers, lathes, vices, anvils, and rolling-mill, and to be supplied with gas, plaster, and sand,—in short, such fitting up as a properly-equipped college laboratory and operating-room would demand to the extent of the purpose in view. This home should be accessible to members of the societies uniting in its support, and upon application to the clinic committee, or committee in charge, and to such other members of the profession as desire to give clinics before the section meeting, or any meeting held in the home. This privilege to extend over such time as might be necessary in previous preparation for the clinic, or in the case of members for experiment, or, perhaps, for regular work under control of the committee in charge, on payment of specific fees arranged by the section. The supply of the requisite heavier tools and instruments would materially reduce the apparatus a useful demonstration requires an operator to bring sometimes, from a great distance and at considerable expense, and too often at no pecuniary recompense to himself. It would increase the chances for superior clinics, and elevate the tone of these demonstrations as well as increase their worth and scope. A nice operator deserves nice surroundings, and expert work demands complete equipment of tools and instruments. Added to this home scheme might be the establishment of a limited number of apartments for the entertainment of guests of the society; in fact, the whole scheme covers in many of its features the plant of a post-graduate school as well as a social club, and could be made to serve a very useful purpose in elevating our profession. These sections might be combined in a union which would publish its own transactions, and could include a publication bureau for the general profession, through which notices of meetings and general professional printing and publishing could be carried on. Many of the supplies would be willingly given by members, and the initial expense of such a home need not be very great. As all things must have a beginning, the effort at first might be small and cover little ground, and grow with the development of its own worth. A bureau of information would naturally result from such a home; assistants and operators could find mutual help through it; improvements in methods and apparatus could be encouraged by it, and the opportunities for exercise of beneficent action

would constantly arise. The scope of such a home can hardly be named. Dr. Atkinson proposes that society members, or others, would notify their local clinic committee of their willingness to give one or more clinics, naming the case or cases and the times when they would hold them, and that engagements could then be made, either by the committee or through it by the operator, by which not more than five dentists would be invited to witness the clinic; and as there would be several separate opportunities thus offered, preferably on regular days, as societies now hold their clinics, many would really *see* the clinic, and therefore benefit by the whole operation; whereas now, one or two *may* see most of a clinic, but the fact of the operator working away from his accustomed surroundings hampers him, as also does the crowding of the many eager to see all they can. Any clinic committee will agree that to secure good operators on good subjects is anything but an easy task, and a thoroughly good clinic is of immense value in bringing home to the observing dentist the daily need for thoroughness.

NECROSIS OF SUPERIOR MAXILLARY AND PALATAL BONES.

The result of Alveolar Abscess and a Rubber Plate.

By WM. D. BABCOCK, M.D.

THE patient, a seamstress, was 27 years old. Menstruation had been irregular, the intermenstrual period sometimes extended to six months; her health was otherwise good. Her family history excellent. At 14 she commenced having trouble from her teeth, usually those of the right upper, all the teeth on this side were affected, occasionally all those on the left. The attacks continued intermittently for five years, when alveolar abscesses formed around her upper teeth, causing an offensive discharge from every one. In order to obtain relief all the upper teeth were extracted. She then had a rubber plate fitted. In May, 1885, she noticed that her nasal catarrh, which had previously been slight, was rapidly growing worse. Her head, too, gave her considerable annoyance, feeling as if it were stopped up by a bad cold. After a season of apparent recovery, she had, in June 1886, a return of the catarrhal symptoms, and has suffered from these more or less

ever since. In September, 1887, she first noticed an opening in the hard palate, at the junction of the superior maxilla and the palate bone, though she had never felt any particular tenderness in or sponginess of the hard palate. Dr. Babcock saw her first in November, 1887, when he removed the vomer ; and since then a portion of the palate processes of both palate and superior maxillary bones, along with a part of the alveolar process of the right maxilla, between the cuspid and bicuspid teeth. She has now in the hard palate an oval opening three-fourths of an inch long and half an inch in width at the widest part. He says he had never before seen such rapid and wholesale destruction of bone, unless it was caused by syphilis. In this case he could not find any sign of syphilis. She willingly submitted to a course of antisiphilitic treatment, but without deriving the slightest beneficial effect. After finding that the treatment did no good, he began to look about for other possible causes. He noticed that although she was wearing a well-made rubber plate, yet the gums were red, swollen, and tender throughout the extent covered by the plate, and he advised replacing it with a metal plate. Since wearing this she has made a rapid change for the better. The odour and the discharge ceased ; the gums became hard and of a natural colour, and the destruction of bone entirely stopped. This case was a unique and instructive one. The disease was first an alveolar abscess, and then destruction of the periosteum. The process now following up the lymph canals, invaded the Schneiderian mucous membrane on account of its intimate connection with the previously affected parts, and gave rise to the so-called catarrh. The bone destruction was aided, by the rubber plate for as this is a non-conductor of heat, it would prevent—the mischief once started—the heat escaping from the point of abscess formation, and thus increase the mischief.

APPLICATION FOR ARTIFICIAL DENTURES WHEN THE MOUTH IS UNDULY SENSITIVE.—M. Martin, of Lille, recommends the following—

Vaseline..... 3 11 grs.
 Balsam of Peru..... 3j
 Powdered Tannin xv. gr.

He smears this over the denture before inserting it. It is also a good application for sensitive gums.

Reports of Societies.

THE MANCHESTER ODONTOLOGICAL SOCIETY.

The Inaugural Meeting of the above Society for the session of 1889-90, took place on Tuesday evening, the 12th of October, in the Grand Hotel, Aytoun Street, Manchester. Mr. P. Headridge, President of the Society, occupied the chair.

Application for membership was read from Percy A. Linnell, L.D.S., Eng., Selden Chambers, 62, King Street, Manchester, to be a resident member.

CASUAL COMMUNICATIONS.

Mr. G. N. Skipp said he had a casual communication to make. It was a case of "bridge-work" which was not, he was glad to say, done by an American practising dentistry, but by an English dentist who had been to America. It was rather an interesting case because of the exorbitant fees which were paid for it. A gentleman had been thrown from his horse. He was recommended for the purposes of his recovery to go to one of the watering places in the south of England. Whilst he was there he was advised to go to this wonderful man to have teeth put in that were without plates, wires, or anything of that sort—in fact it was bliss to wear them. He had them fitted. He next had to pay the bill, and he discovered he had been charged 5 guineas for each tooth, and there were six of them—and six guineas for the operation, made the total account 36 guineas. The gentleman only wore the teeth three days when he was compelled to have them out, as they were so extremely ill-fitted as to be utterly unserviceable. Upon testing with nitric acid the material with which the teeth were set proved to be either brass or German silver.

Mr. E. Collett exhibited models of a case where he had rotated a left upper central tooth in the mouth of a child of nine. The tooth originally was at right angles to its proper position, i.e., presenting its median surface to the front. One of the plates used, a vulcanite one with pianoforte wire springs attached, pressing the one on the anterior surface and the other on the posterior surface, thus causing the tooth to rotate, was also shown.

Mr. L. Dreschfeld (Ex-President), said he was sure from his own experience, that it must have taken Mr. Headridge a great deal of time to prepare such a valuable address as he had read that evening. The older members knew that it was more difficult to fix springs to a set of teeth, than to fix a suction set. What he was sorry for was, that they were not allowed to have a discussion on the paper, as he was sure that the discussion would have been of great interest to all the members. He had great pleasure in asking them to accord a hearty vote of thanks to their President for his address.

Mr. Planck, in seconding the resolution, said he had known their President for 30 years as a practical mechanical dentist, and he has treated his subject, this evening, in a most admirable manner. They all knew that it was contrary to etiquette to discuss the substance of his address. All they had to do was to express their strong approval of the way he had addressed them that evening. He was sure they all felt that Mr. Headridge had justified their choice of him as their President. He was glad to see such an excellent meeting that evening. He was pleased that they had listened to such a practical address, and if they had to seek a *raison d'être* for the existence of their Society, they would find it in the proceedings of that evening.

The President: I can only thank you for the kind way you have received my address, which I am sure some must have found rather too long, of course it is a subject the minutia of which I am thoroughly at home in, as I have spent a great part of my life in the practice of Mechanical Dentistry.

On the motion of Mr. Murphy, seconded by Mr. Renshaw, a cordial vote of thanks was passed to Messrs. Ash for their interesting exhibition of modern dental appliances.

The proceedings then terminated.

STUDENTS' SOCIETY DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, Held Oct. 14th, 1889.

W. HERN, Esq, *President*, in the chair.

THE minutes of the previous meeting were read and confirmed.
Messrs. Allen, Barkley, Braine, Coysh, Goddard, Gardner,

Hall, Jones and Leigh were ballotted for and elected members of the Society.

The following gentlemen were proposed by Mr. Harsant, and seconded by Mr. Preedy for the membership of the Society.

Messrs. F. J. Armitage, Balding, A. Barnes, E. J. Blaine, A. T. Bart, C. F. Carter, B. A. Castello, G. Dalton, Dewhurst, R. W. Gracey, W. E. Harrison, H. G. Humphreys, J. Keckwick, F. Ladmore, E. A. Mansell, W. H. Morgan, W. J. Pike, A. S. Pearse, W. J. Roberts, F. Rooke, A. G. Spiers, H. P. Spurr, W. Sansom, H. W. Taylor, Waller, C. H. Watson.

The President announced that Dr. Dudley Buxton had presented the society with a copy of his pamphlet on "Recent Researches upon Nitrous Oxide Narcosis." He further gave notice according to Rule XV, that at the next meeting he would move that Rule XXV, be so altered that the sentence "the chair to be taken at 7 o'clock p.m., and the meeting to be adjourned at 8.30," may read "the chair to be taken at 8 o'clock, p.m., and the meeting to be adjourned at 9.30. p.m." Also that Rule XXIII shall read: — "That at the meeting preceding the Annual General Meeting the President shall announce the list of officers and councillors proposed by the Council for the ensuing year, and shall ask if any member wishes to propose further names. These names if seconded shall be printed with those proposed by the council on the balloting paper, which shall be posted in the hospital and sent by post to all hon. members residing in the United Kingdom, together with notice of the Annual General Meeting.

On Casual Communications being called for, Mr. Seymour of Folkestone, a late House Surgeon, presented a model of the lower teeth showing five incisors.

Mr. Woolf presented a model of the upper teeth showing three supernumerary teeth, two being in the place of the left central (which had been removed), the third being behind the right lateral. Also a model showing an epulis which had been twice removed, but had recurred, after taking the impression the canine and both bicuspid were extracted, the epulis removed, and the margins of the alveolus pared. Also a model showing hyperostosis of the alveolar ridge after removal of the teeth, this was increasing at about the rate of

$\frac{1}{8}$ of an inch in twelve months. The teeth had been exostosed.

Also a model showing an odontocyst.

The President and Mr. Dolamore mentioned cases of hypertrophy of the gums.

Mr. Oliver presented an upper model taken from a girl, aged 18, showing congenital absence of the four upper bicuspid. The canines were separated from the bicuspid by a space, nothing peculiar was observable about the girl's hair.

Mr. Van der Pant presented some petrified sharks' teeth.

Mr. Preedy presented a model showing a central incisor of great width; it was not a case of gemination as the other incisor teeth were present.

Mr. Porter showed a tooth which gave rise to some discussion. The patient came to the hospital in July, having had a good deal of pain, the nerve was dead. The canals were cleansed and dressed, and in a week's time they were filled, and the cavity plugged with amalgam. The patient returned on Oct. 12th, never having been free from pain and tenderness. The filling was removed, and on passing up a probe distinct pain was caused. It was thought to be a case of perforation, but on removing the tooth it was found not to be so, but that the root was considerably exostosed.

Mr. Rilot pointed out that when pain was caused by passing a probe up a root it was usually considered to be due to one of three causes, the root was perforated, the apex patent, or a portion of the nerve remained alive. But he had found all these might be absent and yet sometimes there was a spot pressure on which caused pain; this was due, he believed, to the sensation being conducted to a hypersensitive periosteum.

The President stated that in his opinion the shock was often due to an impulse transmitted by the column of air and fluid through the apical foramen, that it was so transmitted might be shown by pumping ink into the pulp canal. If now the tooth be placed in clear water, and an instrument passed up the canal, a jet of ink is seen to be forced out of the apical foramen. This taught the lesson that we should never force up instruments with wool wrapped round them, in other words—avoid piston action.

The President showed a pair of forceps for lower stumps, having a thumb-piece close to the hinge, this enabling great downward pressure to be applied.

Mr. Reading presented an upper model showing four well formed bicuspidis on one side, and two on the other. He stated that there was a supernumerary tooth in the lower jaw.

To show the undesireableness of taking the distance the probe passed up a root as a guide to being, or not being through the apex, Mr. Rilot presented two bicuspidis, a long and a short one, which, he said, clearly demonstrated the long and the short of the matter.

The President called on Mr. J. P. Oliver for his paper on "Anæsthetics." [see page 954.]

Mr. Seymour, who opened the discussion, spoke at some length in favour of never giving gas save in the presence of a medical man, enforcing his argument by quotations from various authorities. He referred to the disputed point; whether or no the possession of the L.D.S. Diploma entitles a man to administer gas. Being in considerable doubt on that point, he had written to the Secretary of the College of Surgeons, the only result being, he was informed the Secretary could afford no information. He referred to the injustice in the matter of fees, done to a dental surgeon, who calls in a medical man, by those who do not. The latter generally asks a lower fee for their singlehanded services, and the patient not knowing the risk he had run, does not sufficiently appreciate the additional security of the presence of a skilled anæsthetist, to pay the extra fee without a grumble.

He also pointed out the difference in the duration of the anæsthesia in different people. He mentioned a case in which he pushed it till he obtained well marked stertor and jactitations, nevertheless the patient recovered consciousness almost immediately.

Dr. Dudley Buxton then made some observations :—[see page 963.]

After a few remarks from the President, Mr. Oliver replied.

The President then tendered a vote of thanks to Mr. Oliver and to the gentlemen who had brought forward Casual Communications, and announced the date of the next meeting as November 11th, when Mr. Preedy will read a paper on "Replantation and Transplantation."

The proceedings then terminated.

Dental News.

DENTISTS' CONVENTION AT MONTREAL.

THE opening session of the Province of Quebec Dentists' Association was held recently in the medical building of McGill University. The morning meeting was occupied chiefly in receiving delegates and listening to the reports of the treasurer and secretary of the work done by the Society during the past year. The President, Dr. Trestler, occupied the chair. The reports as read showed that the Association was never in a more flourishing condition and spoke in most assuring terms of its future prosperity.

The election of the new board of examiners occupied some time, and resulted as follows : Messrs. Beers, Globensky, Cosgrave, Leblanc, Hyndman, Bowdon and Andres. The officers are:—President, Mr. Beers ; vice-president, Mr. Cosgrave ; secretary, Mr. Leblanc ; treasurer, Mr. Globensky ; registrar, Mr. Andr .

After discussion a Voluntary society was formed and the following committee appointed chiefly from among the younger members :—Messrs. Geundo, Cadieux, Gentiles, Brown, Burwick, Vosburg and Peppin, with E. B. Ibotson, president ; J. C. Nicholl, vice-president, and F. A. Stevenson, secretary.

During the afternoon a number of clinics were introduced by various members, including Mr. J. C. Nicholl, who gave an interesting specimen of workmanship in the gold filling of a completely rotten tooth. Mr. J. B. Vosburg, of this city, introduced to the association the art of setting the Richmond crown, or in other words, restoring a lost tooth without the use of a plate, the tooth still retaining its beauty and utility. This new style of replacing one or more teeth is undoubtedly far ahead of the old method, which necessitates the use of the plate, and will in all probability be largely adopted by those requiring the services of the dentist in that capacity.

The following clinics were also given : J. Gentiles, setting Ottolengui crown ; G. H. Weagard, Cornwall, copper amalgam filling ; E. B. Ibotson, setting Logan crown ; G. Lovejoy, gold filling ; P. Brown, gold filling ; C. H. Wells, Huntington, treating exposed pulps.

In the evening the visiting delegates were invited to dinner.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.
40, Leicester Square, W.C.

The next meeting of the above Society will be held at 40, Leicester Square, W.C., Monday, Nov. 4th, at 8 p.m. Business:—Paper by Dr. Felix Semon, M.D. F.R.C.P., "Some Points in the Etiology diagnosis and treatment of Empyema of the Antrum."

E. G. BETTS, Hon. Sec.

FACULTY OF PHYSICIANS AND SURGEONS
OF GLASGOW.

At the October Sitzings of the Examiners, the following gentlemen having passed the Examinations, were duly admitted Licentiates in Dental Surgery:—John Newsome Baxter, West Kensington; Harry F. Briggs, D.D.S. Mich., Torquay; Alfred Dulling, Hull; Horace H. Elliott, Kilburne Square, London; Thomas Furners, Chesterfield; Ernest Latham, Manchester; Alfred B. Stoner, Brighton; Thomas H. Taylor, Paisley; George A. Watt, Hartlepool. Two candidates were remitted at the first part, and three candidates at the second part of the Examination.

APPOINTMENTS.

Mr. C. H. Smale to the post of House Dental Surgeon to the Victoria Dental Hospital, Manchester, vice Mr. P. A. Linnell, resigned.—Sept. 20th, 1889.

Mr. Isidore F. Prager, L.D.S., has been appointed Dental Surgeon to the Western General Dispensary, Marylebone, W.

VACANCIES.

National Dental Hospital, 149, Great Portland Street, W. The post of Assistant Dental Surgeon is vacant. Applications before Nov. 7th to the Secretary.

National Dental Hospital, 149, Great Portland Street, W. The post of Anæsthetist is vacant. Applications to be made before Nov. 7th to the Secretary.

Correspondence.

[The Editor does not hold himself responsible for the opinions expressed by his correspondents.]

MOISTURE-TIGHT GUTTA PERCHA FILLINGS.

To the Editor of the British Journal of Dental Science.

SIR,—The hint with which Dr. Templeton is credited, as to the use of resin and chloroform varnish, is old, it has been published many years ago, and no doubt is very well-known in this country. It is by no means the best preparation for drying a cavity, a solution of gum copal in a mixture of ether and chloroform is far preferable, but the principle is the same in both; the action depends on the peculiar power of chloroform in the lighter ethers, of driving water away from a wet surface.

Both the preparations made by myself, *i.e.*, the Carbolised Resin and the Copal Ether Varnish, have this property of driving water away from a wet surface, and Dr. Templeton can therefore hardly be credited with the discovery of what has been very well known for many years previously.

Yours, &c,
THOS. FLETCHER.

Hospital Reports.

STATEMENT of operations performed at the National Dental Hospital, from August 31st to September 30th, 1889:—

Number of patients attended	1870
Extractions { Children under 14	370
Adults	530
Under Nitrous Oxide.	671
Gold Stoppings	77
Other Stoppings	413
Advice and Sealing	235
Irregularities	47
Miscellaneous	180
Total	2525

EDGAR A. N. FIELD, *House Surgeon.*
FRED. A. HUEL, *Assist. House Surgeon.*

British Journal of Dental Science.

No. 524. LONDON, NOV. 15th, 1889. VOL. XXXII.

NOTES ON THE PREPARATION OF CAVITIES FOR COHESIVE GOLD FILLING.

By J. F. COLYER, M.R.C.S., L.R.C.P., L.D.S.
Demonstrator of Cohesive Gold Filling at the London Dental
Hospital.

SUCCESS in filling depends upon carefully prepared and carefully filled cavities. It is to the preparation of the cavity I wish to confine my remarks, and it is not my intention to give any detailed account, but simply to draw attention to facts which seem of the most importance.

For the sake of description it seems best that a few remarks should be made with regard to preparation of cavities in general, and then a short consideration of the methods pursued in preparing special classes.

Firstly, I would draw attention to a most important factor, viz., sharp instruments of all descriptions, especially burs and enamel chisels; they are essential for good results. Next with regard to the application of the rubber dam, previous to preparing the cavity; opinions here vary. I think with its aid one can do one's work quicker, and, what is still a greater advantage, have both hands free to work with. Also with the object of saving time I always prepare my cavities on some definite system, and that pursued is as follows:—

First, to open the cavity up freely by means of burs and enamel chisels, getting rid of all overhanging edges of enamel, etc. Next, to clear out all softened and decayed dentine as far as possible with sharp excavators, and, thirdly, to shape the cavity to the form required to hold the filling.

With regard to opening up the cavity, the most important point is the avoidance of overhanging edges of enamel, they are a source of failure, and too much cannot be said on this point. It is an almost constant rule to take away any enamel unsupported by dentine (the exceptions perhaps being in

those few places where the enamel is not subjected to direct pressure, as for instance on the labial surfaces of front teeth). The reason is simple, enamel is brittle, dentine elastic, and unless the enamel has something to counteract the strain put on it the result is it fractures, and the filling commences to fail.

The next step, removing the dentine, requires but few words, and these are—use sharp excavators and make decided cuts, avoiding scraping, the latter process being extremely uncomfortable to the patient.

Shaping the cavity is a most important item, and may be safely divided into two distinct steps—(1) obtaining a form which will retain the plug, and (2) trimming and paring the edges.

With regard to the former always endeavour to make the cavity so that all parts are easily accessible, avoiding deep undercuts and receding angles, for with cohesive gold each separate piece has to be taken to the place it is intended to occupy, and if you have inaccessible undercuts the result is that that point of the cavity is insufficiently filled.

Remember also that you are putting a resistant substance into a resistant substance, and that, therefore, it will only require the slightest amount of undercut to retain the plug.



Fig. 1a. Showing Enamel Fibres unsupported by Dentine, and illustrating how the edges should not be left.



Fig. 1b. Shape edges should be left.

The edges require great care in finishing, for on them depends, to a large extent, the durability of the filling. The best results are certainly obtained by slightly bevelling the edges, leaving them neither straight nor yet undercut. The diagrams, illustrate this point fairly clearly, and the

reason for leaving them bevelled is also shown. It is this—if you have the edge as in Fig. A there will be a few enamel fibres left unsupported by dentine (it being remembered that the fibres always run in a direction toward the pulp) and the result is that with any undue pressure they will give way, and hence form a vulnerable point in the filling; if, however, you leave them as in Fig. B, then all the enamel is supported by dentine and hence the source of failure removed.

The best instruments for carrying out this part of the work will be found to be enamel chisels for sides of approximal cavities, small spoons for the cervical edges, and fine-cut cavity burs for the crown surfaces.

Passing on from the edges, starting points certainly deserve a little attention, and to make successful ones it is best to divide this part of the operation into two distinct steps, viz., burying the drill to such a depth that the head is just below the level of that part of the cavity where the point is being made, and then moving the head with a slight rotatory motion; if this is carried out the effect is a small cavity of shape illustrated in Fig. 2a.

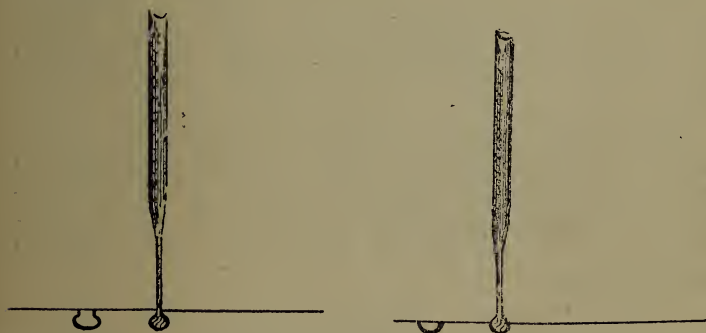


Fig. 2. (a) Illustrates shape starting point should be. (b) The shape caused by not burying head of drill before using rotatory motion.

Now, should the drill-head only be buried halfway, and then the rotatory motion made the effect will be a cup-shaped cavity which is useless for the purpose it is intended to serve.

Further, with regard to starting-points always drill them in dentine, and not at the junction of the enamel and dentine, for if drilled in the latter place, one wall of the starting point is formed by enamel and the effect is fracture during filling.

The direction of drilling starting points should be as far as possible away from the pulp endeavouring the deeper they are drilled the further to go from the pulp.

Another point in preparing and shaping approximal cavities is the relation of the tooth to its neighbour. All joints should be made as accessible as possible to the tongue and tooth-brush in order that food, etc., may be prevented as far as possible from lodging near them, and, therefore, bearing this fact in mind, always cut back the tooth so that when filled and allowed to close you get only the filling in the tooth operated on coming in contact with the contiguous one, and not the enamel of one with the enamel of the other.

Having then made a few brief remarks on cavities in general, we will next consider the shape required for special classes, and for the purpose of description I propose to divide them into three classes :—

(1) Crown cavities, (2) approximal cavities, such as are met with in molars and bicuspids, (3) approximal cavities in front teeth (which involve the greater part of the side of the tooth).

With regard to crown cavities, but few words are necessary. Make the walls just slightly out of the perpendicular, taking care that all decayed fissures are cut out. The floor of the cavity should be made flat, and the edges trimmed as directed above.

These cavities are best started by wedging two or three large unannealed cylinders down to the base till they are steady. Starting points should be avoided, there being a danger in drilling them of injuring the pulp. Fissure and inverted cone burs will be found most useful for shaping this class of cavity.

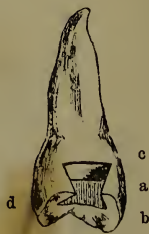


Fig. 3. a. Anterior Surface. b. Crown Surface. c. Labial Surface.
d. Lingual Surface.

Approximal cavities in bicuspid, etc., however, require more care in preparation. To facilitate their description I will take, as an example, a cavity in the anterior approximal surface of a first upper bicuspid. Fig. 3 represents such an one, and if reference is made to it, one will readily see that in this class of cavity there are two directions in which we have to prevent the filling coming out, these are marked by arrows on the diagram and are the one from above downwards, and the other sideways.

To overcome this, two ways are open to the operator ; the one by cutting the labial and lingual walls so that they diverge not only in a direction towards the cervical edge, but also towards the second bicuspid. The shaped cavity made being a double wedge.

The other by making two lateral grooves, which diverge slightly as they proceed upward. The cervical edge in these cavities should be left quite flat, and the edge of enamel bevelled off slightly ; should, however, the cervical edge be near the termination of the enamel, then it is best to remove all enamel remaining, and allow the edge to be formed by dentine alone, a thin edge of enamel is pretty sure to fracture and chip off in filling.

Should any fissure exhibit itself on the grinding surface, it must be cut out; if this is done it will form an additional hold for the filling, if left it is a nucleus for fresh trouble.

Anchorage in these cavities is obtained by making two starting-points, one in either cervico-lingual and cervico-labial angle, great care at the same time being taken that they are drilled in dentine and not at the junction of the enamel and dentine.

In approximal cavities in front teeth a different mode of procedure to the above is necessary. The hold for the filling is obtained by grooving both labial and lingual, if there is enough dentine remaining at those parts of the cavity. The cervical edge being left flat, and at each cervico-labial and cervico-lingual angle a starting point drilled and these latter opposed by a pit drilled at the apex of the cavity.

A point of importance in these cavities is to avoid leaving frail walls on the front surface, if left, and improperly filled, the tooth and filling appears black and looks extremely ugly.

When possible, I drill out all cavities in front teeth from the back, cutting them to the shape recommended for bicus-

pids, etc. The advantage of this method is that the front surface of enamel is able to be retained, and the showing of a large amount of gold overcome, this latter to some patients being most objectionable.

Finally, the fact should never be lost sight of, that success in filling depends as much upon carefully preparing the cavity as on filling it.

The diagrams I have used have been kindly drawn for me by Mr. Phillips one of the senior students of the Hospital.

SOME HINTS ON FILLING AN ARTIFICIAL TOOTH.

By C. C. EVERTS, M.D., Indianapolis, Ind.

WE often meet cases in practice where one or more gold fillings are almost a necessity, to make artificial teeth look natural and disguise art. For a person who has for years had a display of gold work in their front teeth to suddenly appear with a perfectly sound and white set of teeth, not only advertises their artificiality, but does it in so open a manner that it cannot help but appear unsightly and unnatural to friends and acquaintances. Every dentist should be able to perform this operation in a thorough and sightly manner, but from the many miserable botches we see it is quite evident some are incapable of so doing. The first step is to shape the cavity. There are teeth on the market that are made with cavities, but you can seldom find one suited to the case in hand. I first grind the surface of the tooth I wish to fill with different sized corundum points, forming a shallow cavity, just the size and shape I want the filling. I generally in a full upper denture put two fillings, selecting the proximal surface of the central in one block and lateral in the other. I think two fillings look better than either one or three, but when you have extracted the natural teeth you can often copy the size and shape of fillings in the artificial set. I let the cavity extend pretty well over the face of the tooth, as the filling is there to show, and if it is down between the teeth it is shaded looks dark and defeats its object. The next step is to drill the retaining point, the diamond pointed drill is the best to use for this, although it may be done with an extra hard tempered engine bit moistened with spirits of camphor. It is un-

necessary to put much pressure on the drill, many drills are ruined and manufacturers blamed for this fault in the operator; simply hold it lightly against the tooth, it will cut faster and no danger of breaking out the diamond point. The cavity should be kept wet. I take a common blow-pipe in my mouth, draw it full of water and hold the tongue over the end to prevent its escape; the small end of the pipe naturally comes over the work, and by admitting air I can regulate the amount of water just as I want it. It is not necessary to make the pit very large, I make it a little larger than the drill and give it a slight undercut. The filling will hold if the gold is condensed properly. The tooth is now ready to fill and can be finished and polished on the lathe wheels, and if it has been properly done it will add a great deal to the appearance and materially to the dentist's profit.

TREATMENT OF PYORRHŒA ALVEOLARIS AND SIMILAR TISSUE ALTERATION.

By CHAS. B. ATKINSON, D.D.S., New York.

THE varying conditions of the tissues must be the daily guide for their treatment. A *general* statement of treatment may be as follows: When the tissue is dark, blue in colour, swelled and soft, lancing, to relieve the venous congestion, and the injection of aromatic sulphuric acid of the full official strength are indicated.

Where it is evident suppuration is present, has been or will be more or less immediately, evacuation of the pus, hydrogen peroxide and caustic paste (potassa fusa $\frac{3}{4}$ and acid carbolic crystals $\frac{1}{4}$) are indicated. Here let it be said, hydrogen peroxide when properly made is harmless to the tissues. There is plenty of commercial hydrogen peroxide containing excessive quantities of acid, therefore care should be exercised to procure such only as is especially prepared for medicinal use. It is this preparation that is specifically recommended. To resume: When the tissue assumes a cherry red colour, salicylic acid solution saturated in alcohol is indicated. When a warm pink colour shows with or without a speckled appearance (one evidence of fresh granulation), a saturated solution of tannin in glycerine is indicated. It is also advisable to

have recourse to constant exhibition of antiseptic and stimulating mouth-washes, and insist upon their faithful daily use especially on rising and retiring.

Solution of hydrarg. bichlor. 1 to 500 solution, a saturated solution of hydro. naphthol in water, and hydrogen peroxide represent washes which may be flavoured advantageously with tinctura calendulæ, ʒss to each ounce of solution, and used largely, especially the latter two.

Each case necessarily presents its own features of alteration and alternation, and the foregoing is advanced as a general statement of conditions and treatment which have been uniformly *successful*, irrespective of theories of, or experiments in chemical action on tissue separated from its vital connection.

Many conditions of inflammation soon reach a stage of restoration where simple syringing or spraying with hydro-naphthol solution fulfills all the requirement for aid to nature's efforts.

The above deals with *local* manifestations, and reference only is made to systemic indications.

PITS AND FISSURES OF THE ENAMEL.*

BY R. R. ANDREWS, D.D.S., Cambridge, Mass.

THE subject to which I desire to call your attention—"Pits and Fissures of the Enamel"—is one more or less familiar to us. I have been much interested, while studying the development of the teeth, in some of the phases of this form of interruption of the continuity of the enamel cap, and also in the causes which have led to it. Almost all authorities have given these imperfections their attention. Hunter speaks of them as cracks on the hollow parts of the grinding surfaces of the molars, filled with a black substance; and Fox, writing in 1803, describes them as irregularities of the grinding surface of the molars, that lead into a cavity in the centre of the tooth. During the progress of the decay it is under this fissure in the internal part of the crown that we find soonest removed, causing the tooth to appear as if the inside had been scooped out; the enamel being so much harder than the bone, remains, and breaks away only as it loses its support from the bony parts becoming dissolved and removed. The chief pre-

* This article has appeared in the International Dental Journal.

disposition to the disease consists in a defective formation of either the enamel or the bony part of the teeth. This original defect in the structure of the teeth, he says, must depend on the want of healthy action in the pulps during the time of the formation of them. It is impossible for him to conjecture what can be the cause of this imperfection, but he remarks that it is very singular and also very certain that the same kind of structure may be observed in the teeth of many individuals in the same family, who in all other respects are quite healthy. He furthermore says that the teeth acquire this disposition to decay from some want of healthy action during their formation. This is proven by common observation that they become decayed in pairs,—that is, those teeth that are formed at the same time, being in a similar state of imperfection, have not the power to resist the causes of disease. He asserts that in some of the teeth the decay is seen to proceed from the interior to the exterior part. In 1835, William Robertson, of Birmingham, England, published a remarkable work entitled “A Practical Treatise on the Human Teeth,” showing the cause of their destruction and the means for their preservation. In this work he has probably given more attention to the subject of pits and fissures than any other writer since his time, with the possible exception of Magitot and Wedl. He has examined most attentively these peculiar imperfections at which each of the several teeth are most liable to the beginnings of decay. He says that it never occurs on clean or smooth surfaces, but, on the contrary, the attack is in all instances made at such points as collect and retain the food : in the interstices between the teeth, in pits and fissures in the enamel, or at such other points as from any cause whatever retain the particles until fermentation takes place. He denies *in toto* Fox’s assertion that in some of the teeth decay is seen to proceed from the interior to the exterior part, and says that all decay is the result of chemical action or is caused by a corrosive substance acting upon the outside. He considers the pits and fissures so often found in the enamel, particularly upon the surfaces of the grinding teeth, the principal cause of their destruction. Mr. Robertson claims that it is to this irregularity of structure, so peculiar to the double teeth, that their greater tendency to decay is to be attributed, and the liability of the teeth in different individuals to decay will be in proportion to the form and depth of these fissures. On the other hand, where there is a close union of the sections of

enamel upon the surfaces of the teeth, there will be no tendency to decay. The enamel is completed and the secreting membrane removed previously to the teeth appearing above the gum, so that no after-change can take place in the structure of this substance, nor can it be affected by any of the constitutional diseases or changes to which the human body is subject. Therefore, the durability of the teeth or the predisposition to decay will depend upon the state of the constitution at that early period of life when the enamel is forming. The enamel of the teeth is now universally acknowledged to be an inorganic substance, and can be acted upon only chemically; therefore, when a tooth has appeared above the gum, we can readily ascertain whether it is or is not predisposed to decay by examining the structure of the enamel, and it will be found that the rapidity of the chemical action of the ultimate destruction of the tooth will be in proportion to the form of the fissures that may be found in it, and their capability of retaining more or less extraneous matter.

Kelly, 1843, tells us that decay begins in the body of the tooth, the enamel being nearly entire. In this case it begins in the bone [dentine] of the tooth directly beneath the enamel, and is therefore called internal decay. It is not, however, always produced by internal or constitutional causes. Internal decay is most strongly marked in the molars at all ages. It commences beneath a fissure on the outside of the tooth; a black or bluish spot is at first observed, which increases in proportion to the superficial nature and extent of the disease, till a great part of the outside of the tooth is discoloured. In a still greater number of cases the disease takes a direction towards the centre, disorganizes the spongy bone of the tooth, and possibly precludes all hope of the preservation before the enamel even cracks. In a third variety the disease burrows for a longer or shorter time so far within the crown as to give little or no external indication of its true condition. The bicuspid is liable to similar attacks under the grinding surfaces, and with the same results. The upper incisors occasionally begin to decay at a natural though imperfectly-formed concavity directly in the centre of their inner surfaces, but when the enamel is entire, we have reasons to believe they never decay at this point. Those who argue that the constitution has but little to do with the teeth suppose that a fissure can always be found over the point where this variety of decay occurs, and hence the only exciting causes

are outward and accidental. Allowing this defect to exist, it must be admitted, for it is proof itself that the constitutional powers were originally unequal to the perfect organization of the teeth, and consequently its powers of resisting destructive agents are below the natural standard, which, in the teeth, are at best lower than in other parts of the system. It is obvious, then, that when any modification of the general health, or any local causes dispose the teeth to decay, it will be seated where they are least protected, on their surfaces in the fissures. Tomes says that molar [and bicuspid] teeth may present to the naked eye all the appearances of a well developed organ, and yet the enamel may be imperfect, and the imperfection may be in such a form as to insure the early loss of the tooth. From the natural depressions which separate the cusps of molar teeth, minute but deep fissures may extend through the enamel to within a short distance of the dentine and they may become larger as they recede from the surface of the tooth. In most cases which he has examined, they have been filled with cementum, or, rather, with that modification of cementum which constitutes Nasmyth's membrane, and very commonly they become the seat of decay. These minute crevices, the existence of which in many teeth one would not suspect, on ordinary examination, are constantly met with in connection with these forms of defective enamel. Again, he says, in the foremost rank as a predisposing cause of decay must be placed the deep but minute fissures found upon the masticating surfaces of the molars and bicuspids.

Salter, 1875, writes,—“The defects in the enamel between the cusps of the molar teeth are very common and very fruitful of destructive disease. The fissures are frequently deep, and at the bottom there exists only a confused, ill-developed enamel that is cracked and porous, affording a most incomplete protection for the dentine from external influence. Depressions on the enamel sometimes occur in unusual positions, giving rise to similar results. Perhaps the most common of these occurs at the back of the superior lateral incisor teeth, and is a pretty sure cause of decay in that situation. These are predisposing causes, practically leaving the surface of the dentine open to the attacks of the fluids of the mouth. Where these defects are only superficial, the enamel itself may alone first suffer.” Salter shows that the tissue under imperfectly formed enamel is always more or less faulty in structure, and says that this imperfect calcification of dent-

ine is in itself a predisposing cause of decay ; that when the calcification globules are imperfectly fused, decay is rapid, when once attacked. He believes that if the enamel of the teeth remains perfectly sound, they never show any exceptional disposition to decay. Another cause which he considered as tending to predisposed decay is hereditary condition to quality, which is passed from parents to children. This tendency, which runs through some families, is so marked and unmistakable, and so independent of any other explainable cause, that it can be supposed to result only from some imperfection in the nature of the teeth, apart from, or super-added to, histological defects. Wedl, in speaking of the cracks or fissures in the enamel, says, "These interruptions of continuity are observed very frequently upon the otherwise healthy, sound teeth of young persons. Upon close inspection by means of a lens, they are found to be much more numerous than one would suspect at first. He says that in order to obtain a definite idea of the appearance of the enamel cap when it presents fissures or carious spots, it is advisable to detach from the dentine the cap of enamel by means of a fifty-per-cent. solution of sulphuric acid. In this way a clear and definite view of the fissures may be obtained. It may readily be shown that when the pigment deposit consequent upon decay is limited to a hardly perceptible dark-brown minute dot upon the masticating surface, it is much more extensive upon the internal or dentinal surface, where it has a roundish or jagged outline. When decay in the groove of a molar tooth is displayed in the form of a very narrow streak containing pigment, the affected portion upon the internal surface of the cap measures a fourth of a millimetre and upward. Wedl speaks also of finding undermining decay in the substance of the enamel ; that is, decay that is more extensive in the deeper layers than is apparent externally on the surface, always forming from a pit. The particles of enamel within crumble away and are detached, leaving a cavity, which increases in extent in the deeper layers. I have a number of examples of this undermining decay of the enamel in my own collection. Magitot, writing in 1870, speaks thus of congenital imperfection of structure : "The external imperfections, whose forms vary infinitely, consist most commonly of the vices of conformation of the enamel layer : these are dark-coloured, irregular grooves on the masticating faces of the molars and bicuspid, fissures which

the finest probe penetrates with difficulty. They approach more or less near the dentine, and sometimes actually reach and expose it. All their characteristics resemble closely decay of the first degree. They are exclusively due to intra-follicular disturbances of their dentification. Now these disturbances, when they occur, ought necessarily, owing to the law which governs them, to be produced simultaneously and in the same degree in all the teeth which are at the same moment in the process of dentification. This is in fact what happens ; and here is found the explanation of identical congenital lesions upon homologous teeth, and consequently of decay, which has the same relative position. It is not surprising, then, to see two molars, for example, or two incisors on opposite sides of the same jaw, presenting the same fissure, the same crevice, the same congenital cavity, and, in consequence, one position, one progress, and one identical form of two parallel cases of decay. Professor G. V. Black states that the occurrence of decay in fissures and pits is dependent principally on the opportunity given for fermentations at these points by the depth of the pits and fissures in the several teeth. This, he says, is modified by the individual predisposition to decay. In the child, this may be inferred after having learned the condition of the teeth of the parents. The enamel, in this position, is very thick and heavy, and the pit or fissure often penetrates it more or less completely, so that the decay apparently does not begin on the outside, but in the depths of the pit, from which it spreads under the strong enamel to a considerable extent, and often penetrates the dentine deeply before giving any sign, especially in children where the dark colour is not present as a warning. It is often shown by an ashy-gray colour seen through the enamel. This type of decay appears very soon after the eruption of the tooth ; the first teeth affected among the permanent teeth are usually the first molars. These cavities occur in about twenty-five per cent. of first molars, or an average of one to every patient who applies for a dental operation." My own experience teaches me that this percentage is considerably under what it should be.

Dr. Black states that the pits are very often absent in the bicuspid and incisors, but my experience again shows that they are almost as constantly present *in the bicuspid* as they are in the molars. It seems as though little more need be said on this subject ; but there are some characteristics of this

form of imperfectly-developed structure that has interested me while studying its appearance under the higher powers of the microscope, and these may add some interest to what has already been said. I allude not only to fissures of the enamel, but also to the character of the dentine immediately within. These interruptions to the perfect formation of the tissues are, I think, largely a result of inherited tendencies, although it must necessarily be difficult to ascertain with certainty whether they may not have been accidentally caused subsequent to birth. You are certain to find a tract of imperfectly-developed dentine under the deeper fissure, and this is the original cause for the formation of the fissure. Thus, a deep fissure found in a recently-erupted tooth is a certain sign of a tract of badly-organized and softened dentine within, which may or may not be infected at this time with micro-organisms. The delicate point of an exploring needle demonstrates that the dentine is nearly or quite exposed. A fissure drill pressed through this, apparently enters normal dentine ; a little deeper, and sometimes considerably deeper, drilling reaches a softened and extremely sensitive tract of the poorly-organized tissue. In examining sections of this class of teeth we find this poorly-organized tract to be made up largely of globules of calcified matrix, and the spaces between them are filled with a partially-calcified substance, sometimes called interglobular substance, but which is really "calco-globulin." The globules are seen to be a mass of transparent spherical bodies of various sizes, and they are very numerous under the fissures, so numerous that they enclose jagged spaces called interglobular spaces. In a developing tooth calco-globulin is found everywhere on the edge of the calcified dentine between it and the organic pulp. I have often noticed it in globular formation, though it is usually in a smooth layer. The globular formation may have been some pathological interruption in the regular process of development, or it may have represented a primary stage in the formation of the dental tissue. I am not as yet sure which. It is possible that an inherited tendency or any interruption in the normal process of tooth evolution might cause the dentine to assume this primary or imperfect globular structure. The spaces are soft like cartilage, and when the mass is pressed with an excavator or other instrument, it yields, disturbing large numbers of fibrils that are in the mass. This causes considerable pain. The existence of these

interglobular spaces can be regarded with certainty as a condition predisposing them to decay, and when these spaces become invaded by infection the decay will necessarily be very rapid. Teeth having these characteristics are usually larger than teeth of the ordinary size. Their faces are rough and irregular with protuberances, rising not only from the grinding faces of the bicuspid and molars, but often from their sides, with deep fissures between them. Their colour is usually a muddy white. The palatine surfaces of the incisors and cuspids also have these fissures. They usually decay very rapidly, and in some cases nearly set at defiance the resources of the dentist. Other classes of teeth, having this same interruption, are found to be uncommonly long, and of a bluish appearance; incisors are thin and narrow, and the cuspids much pointed. The bicuspid and molars are small in circumference, and have deep fissures upon their grinding surfaces. They have a soft, chalky texture, and the decay is usually light-coloured and rapid. These imperfections are by no means confined to this class of teeth. In teeth of far better quality fissures, or really cracks and pits in the enamel are commonly found. They are between the cusps, more often upon the prominences of the cusps, here in the form of pits, and upon the approximal surfaces of the teeth. Some of these probably have their origin from accidental causes. On the prominences of the cusps the pits are often found to lead into what are called undermining caries of the enamel, already spoken of. Sometimes the pit is a dark spot which leads into this cavity, and sometimes this pit is light and difficult to see. It can easily be detected in teeth which are examined by a mirror, where light is transmitted through them, when it appears as a gray or brownish spot within the enamel. Although the cavities of decay are within the substance of the enamel, they rapidly enlarge and expose the dentine, when infection follows. Cracks are often found on the approximal surfaces of poorly-organized teeth. They lead into a decayed tract of the dentine which is separated from the enamel by the decay the dentine is deeply pigmented, in colour a yellowish brown. Tubuli everywhere against the decayed portion are found to be full of micro-organisms, gas-bubbles, and granules. These extend in a dark tract nearly to the pulp, looking as tubules do in dried sections when they are full of air. On other sections where pits are found upon the prominences of the cusps, dark-brown tracts, running through the

enamel to the dentine, are seen. The tubes near this tract are found discoloured and infected. This line of infection runs into the substance of the dentine, in the direction of the tubuli, nearly to the pulp. Between it and the pulp, however, there is a lighter layer of tissue, which may be caused either by the resistance of the pulp to the inroads of infection, or may be an uninfected decalcified layer, caused by the acid given off by the infection. Where a section of the recently-infected tooth has not been specially prepared by staining, to show the organisms, the infected tubes have in them minute bubbles of gas, which look like micrococci. Some of the bubbles join together like little rods, having the appearance of bacilli, and may easily be mistaken for such. Their origin is probably in the action of an acid on the lime-salts of the dentine. This acid is given off as a waste product by the organisms, and is everywhere present in early-infected dentinal tubes. It has the appearance of what Professor Miller has described as broken pipe-stems in the dentine, but I do not think it is the same thing. It is an easy matter to prove that the gas-bubbles are not micro-organisms by staining the tissue. I have frequently seen them unstained in sections of carious dentine in which the micro-organisms present were stained a deep red. In all specimens of stained, early-infected dentine, these bubbles of gas are present in large numbers. Cracks are often found to be present on the approximal surfaces of the bicuspid and molars, which lead into the dentine. I have reason to believe these are more numerous than we suppose them to be, and that they are the cause of much of the approximal decay. Where the dentine within its substance is faulty, as in cases I have already mentioned, these cracks may be the source of infection equally with the fissures in the crown. Dr. George S. Allan, of New York City, is the only writer that I now remember who has called special attention to these defects in this location, although Wedl may have mentioned them. Dr. Allan says that calcification, commencing on the prominences of the cusps, gives rise to as many points of calcification as there are cusps. When they meet, from some unknown cause these cusps do not always unite, although seeming to. Among other places, faults of this kind are found on the cervical portion of the enamel, midway between the buccal and palatal faces. They differ from those found on other portions of the tooth in that

they resemble more closely an ordinary crack, that might have been caused by mechanical force or disiccation.

I can attest the correctness of Dr. Allan's assertion by recent sections made across this portion of bicuspid teeth. These show crevices or cracks through the enamel, in width sufficient to admit of infection by any of the micro-organisms found in decaying teeth.

MISSIONARY DENTISTS.—The favourable reception of missionaries of the Gospel among heathen nations has of late years been greatly promoted by sending as heralds regular graduates of medicine, who, by the exercise of their skill in the healing art, have won the confidence and esteem of the most barbarous and bloodthirsty tribes. The practice of dentistry is, says the *American Journal of Dental Science*, likewise proving a means for peacefully introducing the missionary into the good graces of suffering savages, and in a recent tour of the island of Formosa, it was not an infrequent preliminary to religious services for the missionary to extract fifty or more teeth. The radical relief of toothache, by simple and obvious means, may well excite heartfelt gratitude in the sufferer, and engender such confidence in the friendly disposition of the dentist that easy access will be gained for the faithful ministration of the Gospel teacher. The attention of the various missionary boards might be profitably directed to the obvious advantages of having more of their messengers duly qualified and equipped for the gratuitous practice of dental surgery among the heathen.

NUMBER OF DENTISTS IN GERMANY.—According to Dr. Paul Börner's "Reichs-Medicinal Kalender für Deutschland" for the year 1888 there are 16,864 medical men and 514 dentists in practice among a population of 46,840,587 inhabitants in the German Empire, while the number of chemists' shops is 4671, and of hospitals 2737. In face of these figures, it may be truly said that the dental profession is not overcrowded in the Fatherland.

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THE NEW ANTISEPTIC.

DENTAL SURGEONS should possess quite as full and exact a knowledge of antiseptics as any general surgeon, and we may almost say should of all specialists in surgery be the most capable of applying this knowledge to their daily practice. The dentist deals constantly not only with septic cavities but with the sources of septicity, and his duty it is to deal with and eliminate all possible sources of infection before he dare to enter upon his truly conservative surgery. The name of Sir Joseph Lister will, when the history is written of surgical handicraft as we know of it to-day, be placed before all others in regard to the practice of antiseptic precautions against septic infection. For not only has he made the whole subject clear to us by his lucid explanations of the bearings and effects of the germ theory of disease, as regards the infective processes which come under the surgeon's care, such as erysipelatous inflammations, abscess, pyæmia, or septic intoxication, but he has also worked out with the nicest care every detail of the somewhat complex methods of antiseptic surgery, and introduced the various antiseptics more commonly in vogue. The introduction, then of a "new antiseptic," naturally suggests the name of the "master," and it is to him that the "new antiseptic" is accordingly due. Sir Joseph Lister, lecturing before the Medical Society of London, thus states the case for the new antiseptic. He first compares it with its elder brother, the Sal Ambroth dressing. Chloride of mercury—corrosive sublimate—possesses, according to Koch's researches, the

power of destroying germs when only of the strength of 1 in 100,000, but as Sir Joseph Lister has pointed out, if albumen is present this germicidal power is considerably lessened and the mercury has then to be used of the strength of 1 in 1000. The difficulty of working with the thick compound formed by corrosive sublimate with albumen induced the trial of sal alembroth, the salt compounded of the soluble chlorides of mercury and ammonia. This body proved more antiseptic than the simple mercurial salt, and when blood or other highly albuminous material was mixed with it, the strength of 1 in 500 was employed. Although the albumen mixed with the mercurial preparation did not precipitate the albuminate of mercury it still formed a loose compound, and very materially lessened the germicidal properties of the metallic salt. The double salt too possessed the advantage over the simple salt of being far less irritating, but the disadvantage of being extremely soluble, and so its powers of checking infection are thus diminished as it is so easily washed away. The next salt employed was the cyanide of mercury, to which we have more than once alluded as an antiseptic. This preparation was capable when mixed with an albuminous fluid, such as serum, of inhibiting, *i.e.*, checking the production of germs, when present in the strength of only 1 in 10,000, but was incapable of destroying germs when once present, even though used of the strength of 1 in 1000 (Watson Cheyne). The cyanide is, however, very irritating, and hence another preparation was tested, namely, the double cyanide of mercury and zinc. This is insoluble in water, soluble in glycerine in the proportion of 1 in 150, and soluble in blood serum in the proportion of 1 in 3,000. Experiments made with whipped blood (ox) showed that salalembroth if below 1 in 400, putrefied in 24 hours after septic inoculation; the cyanide, 1 in 800, checked putrefaction; the double cyanide, 1 in 12,000, stayed putrefaction. When, however, this double cyanide was tested, it was found that but a small quantity of mercury existed in it as prepared for surgical procedure, so that it became subject for conjecture, whether or not the antiseptic properties attributed to the

mercurial might not in point of fact be really due to the zinc salts. Very rigid tests were accordingly applied with the interesting result that although the zinc cyanide—a distinct chemical product—was an antiseptic, it possessed less powerful inhibitory power against infection than the double salt. In the same lecture, Sir Joseph Lister dealt with the biniodide of mercury, but his results do not appear to have been very favourable. In Dental Surgery, we have now had a wide experience with corrosive sublimate, and are all pretty well agreed as to its advantages as well as its drawbacks, and even the iodides and cyanides of mercury have been tried by many with varying degrees of success, but as far as we know, no experiments have been undertaken either with the zinco-mercuric cyanide or the simple zinc cyanide, nor have any experiences of their usages been recorded, at least, in dental literature. The inhibitory power of the zinc salt seems to promise for it a useful field in dentistry, for after all it is mainly as an inhibitor of germ infection which we need, a fact brought home to us by the successful employment of iodoform among dentists, for iodoform is an inhibitor, but by no means a germicide. We trust that the workers in this field will ere long pronounce upon the merits of this “new antiseptic.”

THE DENTAL HOSPITAL OF LONDON.—The Annual Dinner of the Staff and Past and Present Students, will be held on Saturday, November 30th, at the Holborn Restaurant, under the presidency of Christopher Heath Esq. Gentlemen either now or formerly connected with the Hospital or Medical School, who may, through inadvertence, not have received special notice, and who desire to be present, are requested to communicate with the Dean, at the Dental Hospital, 40 Leicester Square.

THE NATIONAL DENTAL HOSPITAL AND COLLEGE.—The recent dinner and distribution of prizes was one of singular interest. Mr. Henry Morris, one of the most popular members of the Middlesex staff, was a first-rate chairman, and

spoke with great clearness in favour of this most excellent charity. The present building has been for some time a great drawback to the School, the more so as a small school is guaged more severely than a large one, which moves, as it were, by its own momentum. Dr. Richardson's reminiscences of the British College of Dental Science will recall to our older readers, men and days gone by, whose work has survived them and left us a goodly heritage. The National Dental Hospital and College are doing a good and useful work, and we trust they will meet with the success in the future which they deserve.

THE TITLE OF "DENTIST."—Referring to the suggestion made by Dr. Stack, of Dublin, the Editor of the *Medical Press and Circular* in what would appear to be an inspired article says,—In the time of our fathers it was *de rigueur* for the medical practitioner to avoid, as far as possible, all titles which would specialise his professional function, and thus it became the fashion for all surgeons, of whatever colour, to call themselves "Mr.," and for all physicians, whether university graduates or not, to call themselves "Doctor." The profession has, therefore, been split up into innumerable fractions, so much so, that every organ in the human economy has its specialist, and every disease under the sun its expert, an extreme which is, from a scientific point of view, nearly as objectionable as the old "Jack of all trades" idea. Medical titles have, however, not kept pace with this change to the fullest extent. A move in this direction has recently been made by Mr. Stack, of Dublin. His contention is that since the passing of the Dentists' Act, the practitioner in dentistry who has obtained registration upon special examination is separated from all other practitioners of that speciality by a sufficiently clear demarcation line to justify him and require him to adopt some definite mark of his special quality. Accordingly, Mr. Stack has, himself, assumed the title of "Dentist" Stack, and has placed on his door a name plate bearing that designation, and his example has been followed

by two other members of the dental specialty in Dublin. He expresses the opinion that, on all those who are anxious to support and uphold the Dentists' Act, the duty is devolved, in the interest of the dental profession, to make clear, and as easily understood as possible, who are those who have a right to the title "dentist." With this purpose Mr. Stack appeals to his professional brethren to make clear to the public not only that they are not either unqualified pretenders who have been raised by an Act of Parliament to the dignity of professional men, nor yet simple surgeons whose knowledge of dentistry is nothing more than the rule of thumb acquaintance which every surgeon is supposed to possess.

FALSE TEETH AND NEURALGIA.—Mr. N. Stevenson writes to the Journal of the British Medical Association: I have recently had to treat several very severe cases of facial neuralgia which would have been cured years ago if they had been sent to a dentist. I believe there are many people suffering from diseased teeth, or are dyspeptic from inability to masticate their food properly, who never receive any suggestion from their doctor about the state of their mouth: on the other hand, some physicians always insist that the teeth shall be put right before any other treatment is followed. The present fashionable mode of immovably fixing false teeth into roots and natural healthy teeth, is responsible for an increase of neuralgia, and should, I think, be discouraged in every way. It is surely unscientific in principle, and must in the result end in disappointment or more serious evil. All false teeth (except those fastened singly into healthy roots) ought to be easily and frequently removed for cleansing, and should never be allowed to damage the natural teeth.

PEROXIDE OF HYDROGEN IN INFLAMMATION.—Dr. H. Fisher St. Louis, believes that peroxide of hydrogen has a stimulating and healing influence upon inflamed tissue in addition to its cleansing, pus destroying properties. He thinks its therapeutic value in necrosed conditions is greatly increased by the free sulphuric acid it contains.

Abstracts of British & Foreign Journals.

THE OHIO JOURNAL OF DENTAL SCIENCE.

ANSWERS TO QUERIES.

BY DR. L. P. HASKELL, Chicago.

“What is your method of investing, backing and soldering?” For investing use either sand or marble dust, and plaster equal parts. Asbestos does not make as solid an investment. He encloses in a sheet-iron ring, a little larger than the case, three-fourth inch wide, because less investing material is needed to heat and keep hot, and there is no danger of portions of the investment breaking away. Heat the case sufficiently to remove the bulk of the wax, and dash boiling water upon it to clean thoroughly. The backing should be thicker than the plate, above twenty-four guage. He prefers backing in the investment, especially gum teeth. For the anterior teeth, do not cover the entire surface but round the top, and in plain teeth do not let the backings touch anywhere. In gum teeth allow the backings to meet as high as the gum shoulder. If there are spaces under the teeth pack in foil. The pins should not be rivetted, for in the first place, there is not the slightest necessity for it; secondly, it cannot be done without removing from the investment, or backing before investing; third, there is danger of cracking the teeth unless an expert does the operation; fourth, when rivetted the solder holds only upon the surface. On the other hand, if the heads of the pins are split with a sharp instrument, that holds the backing in place, and the solder flows into the hole around the pins and they are consequently fastened more firmly. The solder should never be of a lower grade than 18k; if the plate is 20k use same carat of solder. The nearer the melting point of the plate the better the solder works. Otherwise, the solder melts before the plate is hot enough, and “balls.” Use plenty of borax, putting it on and the solder also before heating. Heat slowly over the large gas burner, until as hot as that will make it, then place upon whatever is used for holding it conveniently—he uses a semi-circular sheet-iron pan, open on the

edge, one inch deep, with handle diagonal to the surface. Apply the full blast to the outer surface for a little, and then upon the plate, so as to insure its being as hot as the backings, then throw it upon the backings and plate at once. Dr. Haskell recommends the mouth blow-pipe. It should be larger than the ordinary blow-pipes which are made for jewellers, who use low carat solders, and do not have to heat and keep hot a mass of plaster and sand.

"*What is the best method of tipping the anterior teeth and of preventing the teeth from checking during the soldering process?*"—The best method, perhaps, for "tipping" the anterior teeth is to do it with pure gold, soldering it when the teeth are soldered, either in a separate investment or when soldered to the plate. Dr. Haskell has no trouble with teeth cracking; and he heats the case over the gas for perhaps half an hour, then applies the blow-pipe; after soldering, he lays upon the bench; and if in haste to finish, after a few minutes he places upon a wet cloth, drawing it around the sides of the investment.

COMMON SENSE DENTISTRY.

By M. H. CHAPPELL, D.D.S., Knightstown, Ind.

COMMON SENSE.

All the so-called scientific lore is simply an understanding of nature's laws, and acquired arts. But the key to this supposed mystery is in the ability to comprehend, and the application of handicraft for the desired end. Impaired health, dietetic habits, and senility, will contribute to the softening or decalcification of bony tissue, and *caries* easily destroy tooth structure. Fully 90 per cent. of all the teeth we fill, are subject to the conditions here suggested, and how frequently the dentist will reflect over his failures. This *indolent neglect* on the part of patients will, the writer suggests, induce a strumous diathesis, resulting in the deposit of epithelial or calcareous matter upon the teeth, or a filling up of the "Haversian system" of the cementum with salts and so lead to inflammation and suppuration of the gums. To ensure success for dental operations he suggests proper and earnest

admonitions to patients as to the necessity of thorough cleanliness of the teeth and fillings, with rubbing or friction of the gums, and a kind invitation to visit us soon, that we may keep watch over the operations done. How shall we guard against the possibilities of danger from this neglect or constitutional causes that excite or promote caries in those under our care? 1st. We should commence our operations by thoroughly cleansing the teeth of any and all deposits that may be upon them, with properly shaped instruments, and polish the enamel, then rinse the mouth with a solution of Listerine, or some other flavoured antiseptic mouth wash. Remove from carious cavities as much debris as possible, trim the marginal walls of enamel as may be necessary, polish with discs or strips of sand paper, then apply the dam and secure with ligatures. Shape the cavities for edge strength and retaining filling, which must be done to *preserve the pulp*, to prevent too close proximity, exposure or denuding it. He recommends to use antiseptic dressing, dry well, then introduce small pieces of gutta-percha, after having been heated until *sticky*, and with properly shaped, long shank ball end burnishers, well warmed, force the material into the tubuli of the dentine, beginning at cervical wall, which is the most dangerous locality, thence the entire cavity, and if the filling is to be metal leave no surplus at enamel contact or exposed margin. He asserts *Gutta-percha* is the *safest*, and therefore the best, and the *heat* is the surest destroyer of germs and, as glacial phosphoric acid is used in the phosphate filling the molecules of phosphorus are *migratory*, and will destroy life of the fibrils and pulp (but in less degree than arsenic or chlorine), before calcific deposits are formed into the compact substance, known as the "zone of resistance." 2nd. If the pulp be dead, then the precaution mentioned is unnecessary, and other conditions are presented—treatment of pulpless teeth. *If the apical foramen be closed*, "immediate canal filling" may be done, with some degree of security. Yet there may be a microscopic exudation, of free drainage, and if closed a train of unpleasant, painful experiences will follow, and you will wish you had not been quite so "*immediate*." But if the drainage is apparent, then treatment must be made and the filling delayed. As a cleanser of cavities and canals he used with great success, peroxide of hydrogen and bichloride of mercury, and in connection with this, or following as a treatment in many cases, he has used bi-sulphide of carbon in solution and full strength, and in

some cases with carbolic acid, to pack the canal with cotton saturated with this preparation and seal up for twenty-four to forty-eight hours. It is a disinfectant, microbicide and a "healer" in pulpless teeth when a discharge is apparent. Some patients object to the odour; so they do to carbolic acid and iodoform. He also uses bi-sulphide in dissolving rubber and gutta-percha, used in canal fillings, with the finest results, by saturating cotton shreds and packing them in the canals.

3rd. In using amalgam or alloys, a thorough grinding in a mortar to mix, then continue triturating with bi-carbonate of soda and washing with water until the water pours off clear *is absolutely necessary*. We observe that the process of rolling iron while *hot*, and copper, silver and gold while *cold* improves the malleability, ductility, hardness, compactness and with less liability of change and more useful and durable. So it is with amalgams or alloys. The compression of the crystals forces them to assume a fibrous form, decreasing its liability of spheroidal "bulging" at one point and shrinkage in another. Therefore thorough grinding, with sufficient mercury to make a plastic mass, then, as ready for filling, not too excessive squeezing of the mass to force out any excess of mercury, and with continuous planishing of the material to the walls of the cavity, and the cavity having been prepared as before mentioned, completing the filling in like manner until near a finish, and then with the mass *squeezed dry* as possible, lay on a finishing quantity, which should be allowed to rest twenty-four hours, then cut down, burnish and polish.

4th. A heavy gold foil, No. 30 "cohesive," can be used and rendered soft and pliable by hand pressure and made into a solid contour filling; also, the so-called "soft foil" fillings are a semi-cohesive mass of gold, similar to the heavy gold so-called "cohesive" work. Either kind make first-class fillings. But it is the imperfect extra annealing of gold that makes a harsh, hard, comparatively worthless "cohesive" filling, whether you use light or heavy gold.

5th. Several years ago he had a patient fifty years of age call with a gold crown loose from softening of the dentine (senile caries) in the canals, and pits showing a dark line through the enamel. The crown was removed and he excavated the decalcified dentine to sound dentine; the pulp appeared to have receded by a protective calcific wall. The tooth was enclosed with dam, using the antiseptic treatment and the gutta-percha burnished with heat into all the surface,

with no surplus. He then mixed the oxyphosphate stiff, but sticky, and reset the crown. In setting he continued with pressure until the joint showed no cement. 6th. Wherever you observe healthy gums and teeth in the mouth of a person forty to sixty years of age you will see more or less the cusps of the teeth worn away, the muscles rigid and with little lateral swing to the jaw. Hence, in arranging teeth for full sets for people of this age, in nine-tenths of the mouths so articulated the cutting edge and grinding surface should be ground down or rather giving them *age*, leaving the teeth square, or less rounding, with more of an occluding surface with superior cusps slightly extending, or the arc of the lower jaw narrower in front than the upper, while the posterior portion of the upper teeth are not so wide as the lower. Hence, the lines of the two plates cross on the bi-cuspid and first molars and extend on a straight line back from the point of contact of the lips.

DENTAL COSMOS.

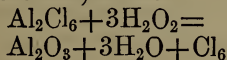
THE CHEMICAL BLEACHING OF TEETH.

BY DR. EDWARD C. KIRK.

BLEACHING in general may be defined as a chemical reaction between a compound having colour, and some substance capable of affecting its composition in such a manner that the colour is discharged, or, in other words, of so affecting the integrity of the molecule of the colouring matter so as to destroy its identity, which necessarily results in a loss of its distinguishing physical characteristic,—viz., its colour. Two general classes of substances have been introduced to the profession for the purpose of bleaching teeth. First, those acting as oxidising agents, and which destroy the integrity of the colouring molecule by removing its hydrogen; the other those which act as reducing agents, and destroy the integrity of the colouring molecule by removing its oxygen. To the first-class belong hydrogen peroxide, H_2O_2 ; potassium permanganate, $K_2Mn_2O_8$; chlorine and the chlorine group, to the latter, sulphurous acid, SO_2 . In the first class, the action of the first two substances named—viz., hydrogen per-

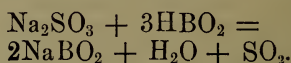
oxide and potassium permanganate—is readily understood when the character of the compounds is taken into account. Both are rich in oxygen; both are unstable and ready to give up their oxygen in the nascent state at any favourable opportunity; and when brought into contact with organic matter rich in hydrogen, the latter is seized upon by the liberated oxygen to form water, and both compounds as such are destroyed. The main practical difference in the action of the two substances is in the character of the resulting by products. Thus in the case of hydrogen peroxide, H_2O_2 , the loss of its one atom of O leaves simply a molecule of water; but in the case of the potassium permanganate there results among other things manganese dioxide, MnO_2 , a dark brown fluid which in itself produces a discolouration that must be removed afterwards by solution in oxalic acid. The writer has used this substance for bleaching teeth, but care must be exerted not to use it in a too concentrated solution, otherwise the final treatment with oxalic acid may fail to completely remove the discolouration from the manganese dioxide which has been precipitated in the tubuli, and leave the tooth in worse condition than at first. With care good results follow this treatment. To demonstrate the activity of permanganate of potassium Dr. Kirk takes two sponges, one is laid aside, the other placed into a solution of potassium permanganate, and then passed into a solution of oxalic acid. Now if the two are compared the bleaching effect of the permanganate is very apparent. The use of hydrogen peroxide is too simple to need explanation. It has not given satisfaction in his hands. By far the most interesting and important agent we have for the bleaching of teeth is chlorine. In the classification of this substance, it is placed among the oxidising bleachers. Because while in a few instances, and under special circumstances, chlorine may act directly upon the colouring matter by uniting with its hydrogen, yet it has been found in practice to act with much greater rapidity and energy in the presence of moisture; in fact, some organic colours are absolutely unaffected by chlorine in the absence of moisture. These facts have led investigators to the conclusion, that chlorine acts by first seizing upon the hydrogen of a molecule of water with which it combines to form hydrochloric acid, and the oxygen which is liberated in the atomic or nascent state attacks the colouring matter and destroys it, the chlorine being thus, indirectly only, an oxidis-

ing agent. Prof. Truman's method, which is now so generally known as to need no extended description, depends upon liberating chlorine from calcium hypochlorite, commonly called bleaching powder or chloride of lime, in the cavity of decay and pulp-canal by some weak dilute acid. He prefers and recommends a 50 per cent. solution of acetic acid, though oxalic, citric, or tartaric acid, may be used; in fact, any dilute acid will serve to liberate the chlorine. The treatment of the tooth previous to bleaching is the same for all methods. The upper third of the pulp-canal should be solidly filled with gutta-percha. Gold has been recommended, but should not be used in any tooth to be bleached with chlorine, as it is attacked by the latter, and the auric chloride formed decomposes in the presence of organic matter by the action of light and oxygen, and results in a permanent purple stain, which cannot be got rid of. For this reason, a tooth to be bleached should have any gold fillings removed if they are in position. The cavity should in all cases be washed out with ammonia or borax to remove fatty matter, and no substance which has the power to coagulate albumen should have been used, as such prevents the ingress of chlorine to the tubuli. For the final washing, distilled water should be used, as river water ordinarily contains sufficient iron to stain the tooth in combination with the chlorine as ferric chloride. Lastly, after the bleaching is completed, the cavity and pulp-canal should be filled with white oxychloride of zinc, which should be inserted with instruments of bone, hard rubber, or wood. It should be carefully borne in mind that no metallic instrument should come in contact with the tooth after the chlorine has been applied. An interesting method was introduced by Dr. A. W. Harlan, of Chicago, in 1884. He uses aluminium chloride in the cavity, from which he liberates the chlorine by means of hydrogen peroxide, thus :



The bleaching is performed by the chlorine, which is liberated by the action of H_2O_2 . The writer published some time since the results of a method for bleaching teeth which he had used with good results for about a year previously, and based upon the activity of sulphurous acid (SO_2) as a bleacher. It has a strong affinity for oxygen, and belongs, therefore, to the class of substances which we know as reduc-

ing. The method consists of liberating sulphurous acid, SO_2 , from sodium sulphite, Na_2SO_3 , by means of boracic acid. The two substances, in the proportion of 100 grains sodium sulphite and 70 grains boracic acid, are desiccated separately, and then intimately ground together in a warm, dry mortar, after which they are kept in a tightly-stoppered bottle for use. In using the powder, the tooth is prepared in the usual way, and carefully dried under the dam. The powder is packed into the pulp-canal and cavity until both are full; the reaction which liberates the sulphurous acid is then brought about by moistening the powder in the tooth with a drop of water, and the orifice of the cavity is immediately closed with warm gutta-percha. The reaction which ensues is as follows :



He has good results from this method. Some discoloured teeth resist the action of any bleaching agent to a much greater extent than others. When one agent fails another often succeeds. Quite recently Dr. Edwin P. Wright, of Richmond, Va., has devised an ingenious apparatus for the application of free chlorine to the teeth for bleaching purposes. It consists of a glass face-piece, to which the rubber dam is attached, making a closed envelope into which the gas is conducted and projected against the interior of the tooth by means of a rubber bulb and tube, terminating in a vulcanite jet. The chlorine is contained in a jar or bottle, which is previously filled with the gas in the laboratory. From this it is pumped through flexible tubing into the tooth, and back to the bottle by means of a return tube of flexible rubber which connects the face-piece and bottle. He has modified this face-piece. A glass-vessel, shaped like a bell-jar, of about two inches in diameter and the same in height, with a flange around its base, the upper end terminating like a bottle-neck, is clamped to the rubber-dam, while it is applied to the tooth to be bleached through the agency of a hinged, double-ring brass clamp, and through the bottle-neck end the gas is pumped to the tooth and back to the reservoir. Failure to successfully bleach a tooth in the first instance may depend upon the presence of some colouring matter which cannot be broken up by the bleaching agent, or be due to the clogging of the dentinal tubuli by some fatty, resinous or other matter which prevents the ingress of the bleaching agent. Teeth

which have been bleached to a certain point and then return to their original state of discoloration do so, for the reason that the operation has not been thoroughly performed, which may mean that the action of the bleaching agent has not been continued long enough, or that the tooth has not been bleached sufficiently high up into the root, or the subsequent filling has not been thoroughly performed. It may also arise from metallic instruments being used in connection with the chlorine process or the subsequent operation of filling. Another class of teeth which present what he thinks is a fertile source of failure in point of permanency are those in which recession of the gum has occurred until exposure of the cementum has taken place to a considerable extent. He believes that such teeth are liable to re-discolouration by the imbibition of the oral fluids through the cementum.

THE DENTAL REGISTER.

REFLEX NEUROSIS IN RELATION TO DENTAL PATHOLOGY.

By GEORGE B. HAYES, D.D.S.

SUCH affections are grouped (i) as those which are caused in remote areas by dental disease and those which occur in the teeth as the result of disease existent in areas remote from the distribution of the 5th pair of cranial nerves. The nervous system has been compared to the "intricate switch board of a huge telegraph office, where are focalized myriads of wires from all parts of the compass. When in normal action, the connections are such that a message from any peripheral point is shunted to its proper receiver, transferred to another wire, or sent into other and higher offices. Subordinate ganglia and spinal centres may be looked upon as relay or local stations with limited authority and power, but which in extreme or important cases must refer to a more central authority. As far as concerns any adequate comprehensions of the mysterious workings of the medulla, either in health or disease, we are very much like an individual wholly ignorant of and standing before the switch-board and unheard of telegraph machines." Dr. Brubaker in the American System of

Dentistry classifies such cases 1st under reflex odontalgia cases whose origin is, 1st, *Peripheral*, including dental, nasal, ocular, and visceral ; 2nd, *Cerebral*, including thrombus, inflammation, tumours, and hysteria ; 3rd, *Systemic*, including malaria, gout, syphilis, and constitutional derangements. The first of these causes of odontalgia, is undoubtedly the most common. The physiological or pathological course of the reflex, ascribed by many to sympathetic action, is the most satisfactory explanation. A single illustration may be taken as typical. Friedberg, in Virchow's Archives gives a case of severe suffering for 12 days by a patient who begged to have the second and third molars extracted. Both were sound but the central incisor was carious, though indolent to percussion. On extraction the odontalgia at once ceased. In cases of nasal and ocular origin, &c. careful diagnosis is needful. Catheterization of the nasal ducts, ocular injections and inflammation of the eyes are aggressive causes. Causes of visceral origin include irritations of the alimentary tract, dyspepsia, sea-sickness, nausea, hunger, morbid conditions of the gravid and non-gravid uterus. Dr. Storer relates the case of a young woman of good health and physique, 4½ months gone with her first child : " Her general health had been good and until the present had never suffered from neuralgia, reported excessive toothache of nearly 2 months standing. It commenced on the left side of the lower maxilla and then affected both sides of the jaw ; that during the whole period she had been under treatment anodynes, local and general, antiperiodics, purgatives, fomentations, and counter irritants had all been tried ; a tooth, the only carious one, had been extracted ten days previous ; and it had been proposed to remove others, but she would not consent. All without relief. She was ordered a fragment of pellitory root, pyrethrum, as a direct gingival stimulant and on the second day presented herself cured, without return of the malady." Cerebral diseases, for example, insanity, softening of the brain, tumours, and inflammation may produce odontalgia, but clinical reports reveal comparatively few, as positive diagnosis is often difficult. Dr. Benson relates a case of a young woman who suffered from severe pain due, as was subsequently shown, to be from an abscess at the origin of the fifth nerve. In very many malarial districts, tooth-aches of a distinctly periodic character are observed relieved by quinine, arsenic. etc. Rheumatism, gout, and specific diseases like

syphilis, affect the dental organs with severe and obstinate odontalgia. The painful and serious results of over-medication with mercury and the iodides belong in this category, as due to systemic derangement. Pathological conditions of the teeth may act as primary inciting causes. Under this head ocular and aural troubles predominate. The following case, singular in its manifestations, exemplifies the irregular and unpredictable courses of many abnormal reflexes. A young girl, æt. 15, subject to copious lachrimation when she left the house. There was no outward manifestations of organic disease, the eyes, looking brilliant and healthy. At length she was brought under a dentist's notice to examine the teeth, the cuspidati of the upper jaw were absent though the dental arch was perfect. Understanding that no teeth had been extracted from the child, the first bicuspidis were removed. Within a week manifest improvement was observable and within three months the cuspidati made their appearance. As illustrative of the frequency of aural troubles Sexton in reviewing the records of 1,500 cases says that "perhaps one-third owe their origin or continuance in a greater or less degree to diseases of the teeth." An interesting case of deafness cured by extraction of a tooth is recorded by Dr. Campbell : Mrs. A., æt. 38, presented herself to have several teeth extracted. Upon removal of a cuspid tooth the patient remarked that she could now hear with her left ear. She had been deaf for 3 years. Muscular disorders form another class of cases under this heading in which active contraction or spasm is brought about by dental irritation. Especially the muscles supplied by the facial nerve, the motor branch of the trigeminus, and the external branch of the spinal accessory. Facial spasm often called "painless facial tic" may occur in the tonic or chronic form, the spasms varying from a few moments to hours. Trismus, is a common result of the impaction and irregular eruption of the wisdom teeth. Over-crowding of the teeth, as in the following case, is a fair example of many similar ones reported in medical and dental journals : "A gentleman æt. 30, had been suffering from lock-jaw and pain under the right ear for the past 12 months ; could separate the jaws in front only about $\frac{1}{2}$ inch. He attributed the mischief to a cold. The teeth were crowded and wedged, particularly in the upper jaw, one of the anterior molar teeth were extracted. The tooth was large but perfectly sound and the patient returned home in a couple of weeks cured."

He further quotes cases showing "Obstinate vomiting resulting in weakness and inability to retain food, due to deposits of salivary calculus." "Vomiting, convulsions, and death from painful dentition." "Uterine neuralgia from eruption of wisdom teeth." Facial and other neuralgias are recognized as serious complications of dental troubles. Of these the most manifest are those coming from the fifth pair of nerves. In general a tendency to facial pain is an accompanying symptom of impaction and alveolo-dental abscess. Neucourt lay down a series of rules for diagnosis. 1. "When a tooth is in itself the seat of pain and the patient definitely specifies it as such, it is the origin of the trouble. 2. When in addition to the pain there follows a swelling of the cheek and gum, resulting in abscess, the indication is specific; if a tooth is sensitive to percussion, seems longer than others, the indication is decisive whether carious or not. 3. Even if the pain is diffused and spread over the side of the face, and attended with distinct exacerbations, thus presenting all the signs of typical facial neuralgia, nevertheless, if it eventually localizes and limits itself in the region of the dental arch, accompanied with pain, redness, and swelling with extreme sensibility to pressure, possibly terminating in an abscess, the disturbance is, in such cases, of dental origin. 4. Another point serving to distinguish neuralgia of dental origin from that due to other causes is the continual agitation and discomfort of the patient. There are no such periods of calm as occur in neuralgia from other causes. The pulse is accelerated and hard, and there is at times general sweating." He cites cases 1st. facial neuralgia of one year's duration cured by the extraction of a carious tooth: "A man, æt. 32, in good health; first experienced pain about the head in consequence of a severe cold. These, under treatment, were succeeded by pains about the cheeks, sometimes in the upper, again in the lower jaw, and upon either side of the face. There was then a space of a few weeks of relief, when lancinating pains were again felt in the right cheek shooting about the face from eyes to jaw; then periods of relief and returning attacks followed each other, the eyes, forehead, and side of the head gradually becoming implicated; in severe attacks the eyelids, lips, and even the muscles of the face, were seized with spasmodic twitchings. Toothache, properly speaking, was absent, the pains often shooting toward, rather than from the teeth. The patient himself had had two teeth extracted in vain.

After about eleven months of continuous suffering, upon advice of a surgeon, another tooth was extracted though it only showed a slight carious imperfection, and the patient had never suspected any trouble from it. It proved to have attached to its roots a fungoid growth. The pain at once stopped without return." The second case is "neuralgia of the arm from carious teeth and undue pressure of artificial teeth related by Mr. Salter, of a lady under his care who had lost all her teeth and was then wearing an artificial set. One curious fact was constantly observed in the progress of her case. When any one of the teeth in the lower jaw became irritable or tender from caries, she was immediately attacked with severe neuralgic pain at a spot, small and circumscribed on the front of the left fore-arm about two inches below the line of flexion of the elbow joint ; and what is more remarkable is, that when the artificial teeth hurt the lower jaw on that side the same symptoms manifested itself. The right side has never been similarly affected." Neuralgia of the face, neck, and arm, with paralysis of the latter, from carious wisdom-teeth, sciatica, neuralgia from a fragment of a root in alveolus, from osteo-dentine, exostosis, and ulceration of the gums are among many other similar causes. There is another category of affections that may be considered as secondary and more remote including disturbances of the cerebral centres, *e.g.*, epilepsy, hysteria, headache, and insanity. The irregularity and intensity of such reflexes is widely varied. Epilepsy, has been known to be excited by dental trouble and cured by the removal of the cause, as the following case will testify : "A lad, a farmer boy, from Windsor, was admitted to the hospital for epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined and the molar teeth of the lower jaw found to be much decayed, and of some of these only the roots remained. He did not complain of pain in the diseased teeth or in the jaw. The decayed teeth were, however, removed and the roots of each found to be enlarged from exostosis. During the eighteen months that followed he had not suffered from a single fit, though for many weeks previous he had two or three per day." The constitutional condition known as hysteria, also considered an hereditary disease, may be induced by sickness, insufficient nourishment, diseases of the uterus, &c., and when the predisposition is established may be excited by almost any peripheral disturbance. Primary among them are morbid

conditions of the teeth. Under the head of insanity, Esquirol says, "Among subjects of a lymphatic and nervous temperament the pains of first dentition sometimes become the cause of insanity. The appearance of the teeth through the gums causes all the symptoms to cease. In the case of three young girls—they had convulsions, bloating of the face, and discharge of saliva—the delirium ceased at the end of a month and two teeth burst their envelopes. Fifteen days after the mania reappeared, with the same intensity; the gums of the late tooth were swollen and red. The attack lasted several months and only ceased on appearance of the teeth.

ANOTHER VULCANIZER EXPLODES.

By DR. MORGAN ADAMS, Sardis, Miss.

A FEW days ago he had just finished examining his vulcanizer—the mercury standing at 330,—and had stepped into an adjoining room and taken his seat, when a tremendous explosion took place. The vulcanizer was on a table, the top of which was about two inches thick and resting on a window sill. The window sill was driven down about two inches; the table was split, and one-half thrown clear across the room, and the vulcanizer thrown upwards, striking the gas pipe, tearing it loose and breaking it, and making a hole in the ceiling large enough to admit the body of a man. The flask was blown open, and one-half of it hurled into the street. Not more than a minute elapsed after he had examined the thermometer, before the explosion occurred. After examining the vulcanizer, which was a "Snowdon & Cowman," he found that the bottom had blown out, and that it was not thicker around the bottom edge than card paper. It had only been used about four years, and not constantly at that. Had he been in the laboratory when the explosion occurred, he must have been killed. He therefore suggests that our vulcanizers be examined from time to time, as a precaution against danger. This can be done by tapping with a light hammer places suspected of being too thin—which would readily yield from a sharp blow—or by using properly shaped calipers. It would be better to buy a new vulcanizer every year or two, than run the risk of losing life.

Literary Notices and Selections.

ABRASION AND EROSION.*

By DR. C. H. ROBINSON, Wabasha, Minn.

WEBSTER defines the word Erosion as "the act or operation of eating away, corrosion, canker ; the word Abrasion as "the act of wearing and rubbing off, also substance worn off by attrition," and the word Denudation as "the act of stripping off covering, a making bare."

These words are used in Dentistry to denote a loss of tooth substance by some process other than that known as dental caries.

There are two distinct and entirely different ways in which this loss of tooth substance may take place. One is undoubtedly caused by the mechanical rubbing or wearing of the teeth of one maxilla against those of the other. The word "abrasion" seems to define this process better than any other word of the English language, and I believe is so used by our best writers. That gradual and unknown process by which one or more of the anterior teeth suffers loss of substance on the labial surface, also occasionally on the whole cutting edge, seems best defined by the word "erosion," an eating away. Some writers, however, call this loss of substance on the labial surface denudation, and that on the cutting edge chemical abrasion. In this paper, however, I shall use the word abrasion to express all loss of tooth substance caused mechanically by rubbing and grinding the teeth together, and the word erosion to express all other loss, whether on labial or approximal surface, or cutting edge, not caused by dental caries.

We all know that the teeth once fully developed are not repaired to any great extent by nature, and any loss of substance, whether by mechanical means, erosion or dental caries is permanent. We expect a certain amount of natural wear year by year, and so do not expect the teeth of those advanced

* Read before the Minnesota State Dental Association.

in life will have the same tuberculated cutting edges and sharp cusps which are to be seen in the teeth of the young. But when we see the teeth, even occasionally, of comparatively young people, worn down so that from one-quarter to nearly the entire crowns of the incisors are gone, and the cusps of the bicuspid and molars so worn that these teeth present flat grinding surfaces, we may know that there is something abnormal either in the teeth themselves or in their arrangement. How often have our patients told us of the man who has double teeth all around, which we recognize as simply a case of abrasion.

Although there may possibly be a few cases of abrasion due to the teeth themselves being deficient in quality, yet in nearly every case we may trace the cause to the arrangement of the teeth, and maxilla—the articulation.

In the normal articulation the superior incisors project over the inferior ones, and the cusps of the posterior teeth articulate with the sulci of the antagonizing teeth. With such an articulation we find it impossible to move the inferior maxilla forward, or to either side, without at the same time lowering it slightly; for as soon as it leaves its place of rest either the cutting edges of the anterior or some of the cusps of the posterior teeth so come in contact as to force the jaws apart, and we find it impossible to keep all of the teeth in contact at the same time. If the movement be a forward one, as in the prehension of food, the outer edge of the inferior incisors comes in contact with the inner edge of the superior ones with a shears-like action, while the posterior teeth do not meet. If a side movement, or in any movement made in grinding food, we observe that the antagonizing cusps come in contact, not merely upon the points alone, but along the whole sides from sulci to points; so that the grinding surfaces are really inclined planes.

In this case we find also that the incisors are almost entirely relieved of any wear. This is a wise provision of nature, as it prevents the teeth from wearing away rapidly, and also gives increased and better grinding surfaces. Where the articulation is such that the cutting edges of the incisors come in direct contact, and the posterior teeth so occlude that the points of the cusps are also in close contact, we find that the inferior maxilla has great freedom of motion, and the antagonizing teeth so wear against one another that in a few years the cusps almost or entirely disappear, and the incisors become

worn, in some cases down to the gum itself, nature usually taking the precaution to keep the pulps protected by a deposit of secondary dentine. The teeth then present worn, flat surfaces, which are not only more or less sensitive, but are also in some cases nearly useless.

These are facts familiar to us all, and it seems hardly necessary to describe them. I shall not dwell upon the different methods of repairing such cases of abrasion by building up with gold, crowning, etc., but rather suggest that we pay more attention to correcting the articulation of our younger patients and prevent if possible this waste of tooth substance. It seems as though with our improved systems and methods of correcting irregularities, that we might be able to do much in this way. Perhaps a slight changing of the position of one or two teeth at the proper time might be all that would be needed in some cases.

Abrasion is also frequently caused by the loss of the molars making the anterior teeth do double duty. We should always try to impress upon our patients the necessity of replacing them with artificial substitutes, so as to preserve as nearly as possible, the full amount of grinding surfaces.

Erosion was first noticed by John Hunter, who called it decay by denudation and supposed it to be a disease inherent in the tooth itself, and not dependent on circumstances in after life, for the reason that it attacks certain teeth rather than others, and is often confined to a particular tooth.

This disease may attack any of the teeth, but is usually found in the anterior teeth, and most frequently those of the upper jaw. It commences as a single minute pit or depression usually in the labial surface of a tooth, and gradually broadens and deepens presenting a cup-shaped excavation in the enamel which in some cases extends so as to involve the entire liable plate of enamel and portions of the dentine. In other cases several pits appear at the same time, and gradually extend until they meet and form one irregular shaped depression. There seems to be nothing definite in regard to the shape of these cavities or excavations.

Frequently we find grooves extending across the labial surfaces within one or two lines of the gum. Again we see irregular denuded areas which present a wavy or undulating surface; other rare cases show a groove extending in a direction parallel with the long axis of the tooth; very rarely are to be found teeth having the approximal surfaces eroded,

and appearing as though filed out with a rattail file. Occasionally are cases sometimes called chemical abrasion, where the incisors are so eroded on their cutting edges as to present a truncated appearance ; the teeth so shortened that the cutting edges fail to come in contact upon closing the mouth, there being a space in some instances of nearly, or quite a quarter of an inch. The rapidity with which erosion takes place varies greatly. Within two or three years it may destroy half or two-thirds of the crowns of the central incisors ; in other cases it may require six or seven years, or perhaps longer, to accomplish the same effect. Where we find a number of eroded teeth in the same mouth, usually some one or two anterior teeth present the largest eroded area, and each succeeding tooth toward the posterior part of the mouth shows less erosion. Upon inquiry we learn that the disease first manifested itself in the tooth or teeth most eroded. The eroded surfaces at first show very little discolouration, but gradually the exposed dentine assumes a light and then a dark brown colour. The surfaces are almost invariably highly polished, and the teeth affected are frequently of a very hard, dense structure, and very sensitive. In fact, these clean and highly polished surfaces are one means of distinguishing erosion from dental caries.

In the treatment of this disease our knowledge and skill at present enables us to do little more than to treat such cases the same as we would cavities caused by dental caries, and fill, build down or crown as the case seems to require.

As regards the etiology of erosion we find a great difference of opinion, some writers claiming that there is no such disease, and that all loss of tooth substance attributed to erosion is caused by some mechanical means, as the too liberal use of the tooth brush and powder, the friction of the lips, etc. There are many good arguments against this theory, such as erosion appearing in teeth that are not habitually brushed, grooves extending in direction of the vertical axis of teeth, which are brushed horizontally, and erosion occurring upon the approximal surfaces of the lower incisors and across their cutting edges, leaving the labial and lingual enamel surfaces intact, which results it would be impossible to produce with brush and powder.

Another theory is that the tooth itself is defective in structure, but our closest observers have failed to detect any such difference of structure.

A very ingenious theory is advanced by Mr. K. Bridgman, in a paper on electro-chemical relations, and is based on the following and similar experiments: A piece of stout copper wire about three inches long was submerged about half its length in dilute sulphuric acid. The latter very soon gave signs by the colouring it received of the copper commencing to undergo solution. and after having been suffered to remain undisturbed for twenty days it presented the appearance above the acid of a bushy rod, the portion exposed to the atmosphere becoming coated with a layer of minute and beautiful crystals of sulphate of copper, extending from near the top to within three-sixteenths of an inch of the liquid. At this intermediate portion a greater amount of chemical action had been induced, corroding the wire about half way through and forming a neck tapering upward.

He then reasons that the action which arises between the metal and the acid is due to polarization and is evidenced by the following proceeding: A similar piece of copper wire wholly submerged in the acid so as to entirely exclude any portion of the metal from coming in contact with the air, remained for many months without imparting the slightest tinge of colour to the liquid, but on suffering the fluid to evaporate, so as to bring the upper end of the metal near to its surface, the instant the slightest portion became exposed to the atmosphere chemical action immediately commenced.

There is, thus, where no sufficiently normal affinity exists between the metal and the liquid to effect the decomposition of water, a power imparted by the metal being polarized by the atmosphere, which renders it thus capable of accomplishing it.

The atmosphere, says Mr. Bridgman, in its normal state being electro-positive, renders, by a well-known law of induction, bodies opposed to it electro-negative. The exposed end of the copper is, therefore, rendered electro-negative, and the acid by the same rule being electro-negative also, the immersed end of the metal becomes electro positive. It is an established rule, that bodies to be electro-decomposed must first be rendered electro-positive; and it is also part of the same rule that bodies receiving an addition of matter must first be made electro-negative. Hence the exposed end of the metal has become negative, and received the crystallization, while the immersed portion being positive has been acted upon accordingly. Now, he says, let us apply these facts to

the mouth. The external epithelial layer of the gum is constantly throwing off its worn-out cells, and by this wasting process determines its electro-positive state, while the crown of the tooth, as a continuation of the epidermal layer, partakes of the like condition. Were the teeth wholly and constantly submerged and protected from the air, it is probable that like the copper wire beneath the acid, they too might remain intact. But as the air is constantly passing into the mouth, or even through it in the act of breathing, they are thus having one end exposed to the air and the other to the fluid, moistening the gum, subject to the same polarising influence as the metals. In the case of the partly submerged wire it has been shewn that the principal amount of electro-chemical action takes place near the surface of the fluid, this point determining the line of demarkation.

Hence in the mouth this line may be taken as the existing free edge of the gums. The moisture accumulating here, in the event of any electro-chemical action taking place, it would necessarily be above that line, and consequently the substance of the teeth directly above the gum would be attacked. We see this actually taking place in the peculiar decay so common at the exterior or anterior basal area of the molars, and also on the same part of the upper incisors. This theory, however, does not explain those cases of erosion of the cutting edges.

Dr. E. D. Swain, of Chicago, has also made a close study of this theory, and having repeated and varied the experiments of Mr. Bridgman, has become fully convinced that the true explanation of erosion is not to be found in this direction.

Prof. Truman has advanced the idea that erosion is probably due to the solvent action of acid mucus secreted by the follicles situated in the labial mucous membrane, and that the disease is more active at night, from the fact that during sleep the flow of alkaline secretions from the salivary glands is arrested, hence the acid secretion of the mucous follicles is not neutralised to the same extent, if at all, as during the daytime—when the salivary secretion is active. In support of this idea Prof. Truman stated that he had caused tests to be made with litmus paper of the labial mucus in the mouths of patients suffering from erosion, by the patients themselves immediately upon wakening, and each time had found a distinct acid reaction, and he was led, therefore, to believe that the disease is to be accounted for upon that ground.

Dr. E. Kirk repeated these tests with the same results, but upon trying the tests upon the same patients during the day, in the office, failed to obtain acid reactions until he had taken the following precautions : the mouth was rinsed with water, and all adherent mucus and saliva carefully wiped from the labial mucous membrane.

A double fold of dry napkin was then placed over the eroded teeth, and a piece of moistened blue litmus-paper sufficiently large to embrace the whole area of erosion placed upon the napkin, after which the lip was held firmly in contact with the litmus-paper for a full minute. Upon removing the paper it was found to be distinctly reddened, but the change of colour was not uniform over the entire surface. It was found that a series of red spots, corresponding in number and position to the orifices of the labial mucous follicles, were dotted over the paper, which after a short time spread through absorption of the acid, and formed reddened areas which bore considerable resemblance in configuration to the eroded areas upon the teeth. He then tried the litmus test upon other portions of the oral mucous membrane and found that the secretion of acid mucus was purely local in its expression, for while that immediately overlaying the eroded area was decidedly acid, the secretions from the palatine mucous membrane were frequently, in fact almost invariably, found to be alkaline. This chemical theory he thinks fully explains those cases of erosion occurring upon the labial surfaces, but it does not explain erosion of the cutting edges, unless a like condition of the acidity of the mucous secretions can be found at the tip of the tongue, which can only be determined by future investigation.

Prof. Black calls the etiology of erosion one of the most obscure subjects in pathology, and says that with our present knowledge it is practically unexplainable. He further states that the theory that it is caused by acid mucus is supported by several who have written on the subject, and our present knowledge affords us no alternative but the acceptance of the general idea that it is the action of an acid under some peculiar modifying influences as yet unknown to us. While this is unsatisfactory in the extreme, there seems to be nothing better to offer. The influence of micro-organisms appears to be out of the question. These enemies are accustomed to seek foul places, and eroded surfaces are habitually clean surfaces. If by a change of condition the

surface eroded becomes habitually foul, caries takes the place of erosion. This occurrence is very rare, but it is not unknown.

Now, if this chemical theory is the correct one, or if we can find acid mucus present, one means of combatting erosion will be by the prescribing of lime-water as a mouth-wash, also the packing of precipitated chalk on and around the necks of the teeth just before retiring, and allowing it to remain till morning.

Now in conclusion, let me urge upon the members of our profession the importance of closely observing such cases of erosion as may come under their observation, that we may some time in the future be able to gather such facts as will enable us to more fully understand the etiology and proper treatment of this disease.—*The Dental Review*.

Reports of Societies.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

THE Ordinary Monthly Meeting of this Society was held on Friday, Oct. 11, 1889, at 8 o'clock. SIDNEY SPOKES, Esq., *President*, in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. Hemstead was present as a visitor.

The names of the following gentlemen were given out as being nominated for election at the next meeting :—Messrs. Andrews, Hemstead and Smith.

Mr. Fred. T. Haycroft, owing to his leaving the Hospital, tendered his resignation of treasurership. It was accepted, and a vote of thanks was accorded him for his past services, to which he replied.

Mr. Arnold Prager was proposed and seconded by Messrs. Dunlop and Faro, as Mr. Haycroft's successor. This was carried unanimously, and replied to by Mr. Prager.

A sub-committee was appointed for the purpose of making additions to the library.

Casual communications :—The following gentlemen shewed cases of interest : Messrs. Field, Haycroft, Faro, Arnold, and Prager.

The President then called upon Mr. Humby for his "Notes on Some Cases in Practice," which he had at a very short notice (in consequence of the gentleman who was to have read a paper being unable to attend) kindly undertaken to read. They were most interesting, and included the following :—

I. A case of retained temporary incisor.

II. A non-erupted lower bicuspid.

III. Two specimens of split teeth (molar and bicuspid both had been filled.

IV. A matrix and engine-mallet (right angled) for use in filling incisor teeth from the lingual surface.

V. A case of perforation of both hard and soft palates.

VI. Crowning a canine stump for a deaf patient, who used an audiphone, and made use of the stump in question to hold instrument in place.

Mr. Humby was accorded a hearty vote of thanks for his kindness in bringing these cases forward, and after the usual discussion the meeting adjourned till Friday, November 1, when Mr. T. G. Read will read a paper on "Crowning and Some Useful and Practical Hints."

Dental News.

NATIONAL DENTAL HOSPITAL AND COLLEGE.

THE annual dinner and distribution of prizes in connection with the National Dental Hospital and College took place Nov. 8th, at the Holborn Restaurant. There was a numerous gathering, including the medical officers, lecturers, and students of the institution, besides a number of guests. Mr. Henry Morris, M.B., presided, and the company included Dr. B. W. Richardson, Dr. Allchin, Dr. Dudley Buxton, Mr. Felix Weiss, and Mr. F. Henri Weiss (the dean) and members of the staff.

After the toast of "The Queen and Royal Family," the prizes and certificates in the honours list were presented to the successful students by the chairman, the names of the

students who had gained distinction being announced by Mr. F. Henri Weiss, Prizes for dental anatomy were awarded to Mr. R. S. Faro and Mr. J. N. Dunlop; for dental surgery to Mr. E. L. Haycroft and Mr. J. N. Dunlop; for dental mechanics to Mr. S. Keele: and in metallurgy to Mr. A. Moore. The Rymer gold medal was won by Mr. J. N. Dunlop. The certificates were distributed as follows:—For dental anatomy, to Mr. E. A. H. Field; for dental surgery, to Mr. W. Rushton, Mr. F. T. Haycroft, Mr. F. E. Cutts, Mr. A. Moore, and Mr. R. T. Faro; for dental mechanics, to Mr. J. N. Dunlop and Mr. Arnold Prager; in metallurgy, to Mr. F. E. Cutts; in dental materia medica, to Mr. F. T. Haycroft and Mr. S. Keele; in elements of histology, to Mr. G. M. Keevil; and in mechanical work, to Mr. J. N. Dunlop. The Students' Society prize was taken by Mr. R. S. Faro.

The Chairman, in proposing the toast of "Success to the National Dental Hospital and College," said that the success now being enjoyed by the institution was well deserved, and the continuance of that success in the future was perfectly assured. The institution could not boast of any venerable old age, nor could it boast of an imposing structure for a home, but it could lay claim to a vigorous young manhood, and point back to more than a quarter of a century of a life of usefulness. Strenuous exertions were being made to build a larger home wherein the institution could fulfil its duties of charity, and relief of torture in a more efficient manner. In proof of the demands upon the hospital he could refer to the fact that the number of cases which had been treated during last year was nearly three times more than the number of cases treated 11 years previously, and in the same time the number of patients had more than doubled. For instance, in 1877 about 13,000 cases were treated, whereas in 1888 there were 40,000 cases, and in the former year there were 10,000 patients as compared with 25,000 patients last year. As the result of this increased number of patients the work of the hospital had altogether outgrown the accommodation of the building in which the operations were at present carried on, and it was gratifying to know that the efforts to obtain a new building had been so successful that already three-fourths of the amount required for the erection of that new home had been secured. There was some delay in the acquirement of the land for the building, but it was hoped that very soon this difficulty would be overcome, and that all the money re-

quired to furnish and equip the building would be provided, so that in a short time they might have a handsome building in Great Portland-street. With regard to the National Dental College, the success of it was intimately associated with the success of the hospital, as the two were so intermingled and combined that the prosperity of one must in the future depend largely on the prosperity of the other. So far as he was able to judge, it seemed to him that the existence of dental schools had wrought nothing less than a revolution in that large section of the medical profession known as dental surgeons, whereby charlatanism, quackery, and imposition were being eradicated. He stated that this college and the London Dental College worked in a spirit of friendly rivalry and of honourable opposition. There was field enough for both of them, and he believed both would be rendered more serviceable by the efficiency of each other. (Cheers.)

The toast was replied to by Mr. Charles W. Glassington and Dr. George Cunningham.

Mr. Sidney Spokes proposed the health of the past and present students. He was personally satisfied that the school was doing good work.

The toast was responded to by Mr. Wm. Rushton and Mr. Prager.

Dr. Maughan proposed the toast of the Visitors, to which Dr. Allchin and Dr. B. W. Richardson responded.

Dr. Richardson in his reply assured those present the great pleasure it had afforded him being present, for he might say that on the last occasion when he found himself associated with the members of the National Dental Hospital it was at their christening, namely the time of the inauguration of the Metropolitan School of Dental Science. He was glad to find that that scheme which had been so carefully made out had resulted in so brilliant a success, and he would mark his appreciation of the school by offering a prize for the best paper read before the Students' Society during the next year.

The Dean then proposed the health of the Chairman. One thing he thought which brought their chairman more in sympathy with the Dental profession was his association with the Middlesex Hospital, for it could not be forgotten that a deep debt of gratitude was due to the authorities of that institution for the assistance they had given to Dental education, for it was they who, with some inconvenience,

altered the times of the lectures, so as to enable the Dental Student to attend his Dental Hospital practice without interruption—a step which had brought forth most desirable results.

During the interval between the toasts, glees and solos were contributed by Messrs. Wybourn, Fryer, Hanson and De Lacy, under the direction of Mr. W. Henry Thomas.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.
40, Leicester Square, W.C.

The next meeting of the above Society will be held at 40, Leicester Square, W.C., on Monday, Dec. 2nd, at 8 p.m. Casual Communications by Messrs. J. Ackery and W. B. Paterson "On a Peculiar case of Fracture of Superior Maxillæ." E. Lloyd Williams, "A Case of Sarcoma of Upper Jaw." G. Cunningham: "Dermoid Cyst containing Teeth," also Mr. C. S. Tomes, F.R.S., and Mr. D. Hepburn.

E. G. BETTS, *Hon. Sec.*

A HORNCASTLE DENTIST AND HIS
ADVERTISEMENTS.

At the Spalding County Court, on Monday, Joseph John Musgrave, dentist, Horncastle, sued Edwd. Wellband, gardener, Spalding, for £2 10s., value of a set of false teeth supplied to his wife.

Mrs. Wellband said the teeth did not fit, she could not masticate food with them, and they caused her such pain that she nearly went crazy. She had a useless set when she went to the plaintiff, and he undertook to supply her with a set which she could use in comfort.

Plaintiff said he supplied the very best workmanship, and could do no more for the woman.

His Honour remarked that it often happened that the formation of the mouth would prevent false teeth fitting, and no dentist could remedy it. He gave a verdict for 25s., the price at which plaintiff had offered to supply sets by advertisement.

VACANCY.

Liverpool Dental Hospital, the post of House Surgeon is vacant. Applications to be made to the Dean.

British Journal of Dental Science.

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A STUDY OF THE CHEMICAL COMPOSITION OF THE DENTAL PULP.*

By W. H. WHITSLAR, D.D.S., M.D., Youngstown.

THE dental pulp is a study, and we are constantly being impressed with the necessity of a thorough knowledge of all that pertains to the histological elements of it, but there seems to have been given little attention to the chemical composition of the pulp-chamber contents, by writers of the present day, and it is for a renewal of the subject that this study is made and presented for your consideration.

When we contemplate the small size of the dental pulp and remember that it is so closely bound by the hard and irresistible walls of dentine, is it any wonder that we find amongst our chemists very few who have ever attempted to analyze it? Indeed, it is a singular fact that there is no dental literature of recent origin, at least to my knowledge, that gives an analysis of the dental pulp. The only analyst who makes mention of such an examination is Prof. Wurtz, who in 1856 published in *L'Union Medicale* an article on the subject.

“Examined chemically by Professor Wurtz, it was found impregnated with a strongly alkaline liquid, and containing in solution a peculiar albuminoid substance. This substance must be a modification of the albumen which is formed by the action of the alkalis upon it. It is precipitated by acetic acid, and is thus distinguished from normal albumen. The liquid which holds it in solution is incompletely coagulated by heat; it is, moreover, precipitated by the mineral acids, tannin, and the metallic salts, such as the sub-acetate of lead, sulphate of copper, corrosive sublimate; alcohol coagulates it in thick flocculi. The alkalinity of this liquid excluding the idea of its holding the phosphate of lime in a state of simple solution; it appears more probable that this salt is intimately combined in the albuminoid matter itself.”

*Read before the Ohio State Dental Society, at Cleveland, October, 1889.

The dental pulp reduced to ash gave, in the hands of the same chemist, a strongly alkaline residue, in which there was but a trace of phosphate of lime.

To Professor Wurtz, then, we give the credit of a very good analysis, but it must be borne in mind that the pulp is so small and heavily encased by the walls of dentine, as well as by the rather intimate union of the pulp by means of the odontoblastic attachment, so to speak, to the walls, that a percentage of the fluid contents of the pulp must be irretrievably lost in the extracting of the pulp from the chamber in which it lies. Again, an analysis of the ash of the pulp does not give the true composition of the salts as they existed in the living tissues.

The reasons are : 1st, when tissues are calcined a part of the salts may come from the oxidation of the sulphur and phosphorus of some of the organic constituents ; 2nd, heat may decompose and volatilize certain chlorides and carbonates. Therefore, by making a chemical examination proper, much well worth knowing may be learned. Yet a *complete* analysis would be impossible. Willing to accept Prof. Wurtz's authority, we have made no chemical analysis of the subject.

Now, knowing the histological elements of the tooth pulp, and the chemical constitution of the separate elements, could we not make a nearer approach to the true composition chemically of the dental pulp than by a qualitative and quantitative analysis ? Let us see.

The dental pulp is generally described as a roseate body—a mucoid gelatinous mass with abundant cells intermingled and including vessels and nerves. A fact here is worthy of notice. Magitôt states, and it is affirmed by Prof Heitzman and Dr. Bödecker, that the dental pulp is the rudiment of the dental papilla and that it differs but slightly from the same organ in the foetus. Magitôt says further that the calcareous masses and crystals of hæmatoidin noticed in the embryo are absent in the adult. Different authorities, including Magitôt, Tomes, Wedl, and Black, say there are no lymphatics in the dental pulp, and this is controverted by Professor Stowell, who says : “ The pulp is well supplied with lymphatics, their walls being formed by the endothelial membranes ensheathing the blood vessels.” In an analysis of the pulp it is not important to include an analysis of lymph excepting sugar, which was found in human lymph by an analysis made by Gubler and Quevennel.

Along the border of the odontoblastic layer of cells another study shows the deposition of lime salts, which, in their physico-chemical changes, are called calco-globulin, but when fully calcified produce phosphate and carbonate of lime, magnesium phosphate, and sodium chloride. These changes are also another means of making a real chemical analysis a failure, because as described by Tomes, "It is a remarkable fact that parts which are on the borders of calcification have a remarkable power of resisting reagents."

To sum up the tissues of the pulp, there may be found the following :

Odontoblastic cells, connective tissue cells, nerve cells, medullary corpuscles, white fibrous and yellow elastic tissues, unstriated muscle fibres, cement substance for odontoblastic layer of cells, and cement substance for the connective tissues, lymph, blood and nerves.

Having learned the histological elements of the pulp, we may now inquire their chemical composition.

CELLS.—"Protoplasm is the essential constituent of the body of every cell." It is composed of water, albuminoid substances, and is associated with some carbohydrate, fat, and inorganic salts. Symbolically represented it is $C_{24}H_{17}N_3O^8$. The medullary corpuscles are composed principally of protoplasm.

White fibrous tissue is found as a constituent of every nerve and blood vessel and is distributed throughout the pulp. The chemical property of white fibrous tissue is collagen, a body that furnishes gelatine when boiled in water. Mucin a nitrogenous glucoside is the material that composes the cement substance that holds the connective tissue cells. Globulin is said to be the cement substance for the odontoblastic cells.

Nerves are said to enter the pulp canal by one large branch and three to six smaller ones. The fibres are medullated and non-medullated. "There is still much doubt and uncertainty as well as difference of opinion," says Cranston Charles, "as to the true chemical constitution of nerve substance, particularly as to which are real nerve constituents and which only decomposition products or mere mixtures." Without going into detail, it is sufficient to append the analysis of Moleschott, who gives the chief constituents of nerves, not brain or spinal cord as follows :

Water,	57.07
Ethereal extract, fat, cerebrin, cholesterin, lecithin, protagon, etc.,	22.11
Salts,	0.85
Potassic phosphate,	0.18
Sodic phosphate,	0.13
Calcic phosphate,	0.19

An analysis of the ash after the separation of lecithin, etc., by Geoghegan, gave

Potassic chloride.	0.277
Sodic phosphate,	0.221
Potassic phosphate,	.047
Sodic carbonate,	.044
Magnesian phosphate,	.030
Potassic sulphate,	.24
Calcic phosphate,	.003

The blood and its vessels next command our attention. The *mean composition* of the blood as given by Becquerel and Rodier is

Water,	per cent.	78.16
Dry corpuscles,		13.50
Albuminoids,		7.00
Fibrin,		2.25
Fats,		0.17
Extractives,		0.84
Earthy phosphates,		0.03
Iron,		0.05

The ash of human blood is thus given by Jarisch in the 100 parts :

Chlorine	30.74
Potash,	27.55
Sodium,	24.11
Phosphate acid,	3.82
Sulphuric acid,	7.11
Oxide iron,	8.16
Lime and Magnesia,	1.33

In all analysis of blood or other circulating fluids it must be remembered that age, sex, and situation have much to do with their composition.

The blood vessels give us additional tissues to deal with, namely—unstriated muscular fibre and the yellow elastic tissue. The elastic tissue yields elastin, and the muscles yield water, albumen, ethereal extractives, non-nitrogenous

bodies glycogen and glycocin (Chittenden). The presence of unstriped muscle fibres and yellow elastic fibres have been denied by some.

In conclusion, we might add that all bodies of the dental pulps are alkaline; that the CO_2 , N, O, in gaseous form would be found if it were possible to deal with a pulp on a gigantic scale; and that resolved into primary elements, the following would be found; Oxygen, Nitrogen, Hydrogen, Carbon, Phosphorus, Calcium, Sodium, Sulphur, Potassium, Chlorine, and Iron.

You will also notice that this is a study of the living dental pulp. A study of the dead and decomposing organ would be an altogether different thing.

Again, to be concise and not tiresome, many details of this paper are omitted for the sake of brevity alone, and having accomplished, in a measure, the study of the chemical composition of the dental pulp, it is hoped that this will prove an incentive to those who are better able to take up the subject to pursue it further.

SOME HISTORIC POINTS AND PRACTICAL HINTS ON CROWNING.*

By THOS. G. READ, L.D.S. Eng. D.M.D. Harvard.
Assistant Dental Surgeon to the Hospital.

The clinical aspect of this subject as far as possible, I shall avoid, therefore the making of any special crown will not be described.

Crowning was probably attempted at a very early date.

In former days teeth required to be very loose to be removed, as the ancients had no suitable instruments with which to extract and there was a strong feeling against mutilating the body. The hard work that the anterior teeth had to perform in tearing flesh from bones, and other uses, to which they were put, moreover their exposed position rendered them very liable to be broken.

No doubt some effort was made to correct this disfigurement, and it may be readily conceived that when an opening was noticed in the broken off part to correspond to one in the remains of the tooth left in the jaw, the broken or the corres-

* A paper read before the Students Society National Dental Hospital.

ponding part of another tooth was connected to the stump by means of a dowel or pin often miscalled a pivot.

The earliest crowns were portions of natural teeth both of human beings and of the lower animals and artificial ones carved from various tooth-like substances.

I shall endeavour to conclusively prove to you that all crowns now used are modifications of methods known and practised forty years ago.

In the year 1774, M. Duchateau, an apothecary of St. Germaine, and M. de Chemant, a dentist of Paris, commenced a series of experiments with the object of making teeth of porcelain, and after several years of perseverance they produced a material the merits of which were fully recognised by the profession for dental uses.

Crowns were soon made in this material, they roughly resembled teeth and had a hole for a dowel, they were rather weak, being made of a poor kind of porcelain resembling wedgewood ware glazed over with a semi-transparent glass of a greenish or bluish tint, the dowel used to set them was usually of wood alone, or wood and wire.

But little improvement was made in their appearance until the year 1825, when Samuel W. Stockton, of Philadelphia, and a few others made a far better composition and produced teeth much more life-like in shape and shade ; in 1830 they made some crowns which were in many respects better adapted for use than any of a later date ; the dowel hole was deeper, of better form and more conveniently placed.

In 1831, Dr. Lee, of Alabama, used instruments very like those described and used later by Dr. Brütter, these are of very little use as they are only suitable for circular roots.

In 1841, tube teeth with a metal dowel were used.

In 1849, a hollow dowel was patented for permitting gases and secretions to escape from the apex of the root.

In the same year, Dr. Lawrence, of Philadelphia, patented a crown similar to the Bonwill. It consisted of porcelain with a counter-sunk aperture for a screw.

Dr. Morrison about this time used a crown very like a Richmond. In describing this he mentions a band or collar fitting around the root supporting a crown with a dowel. The Logan is a modification of the old porcelain wood dowel crown, platinum being used instead of wood.

An ideal crown should reduce the chance of destruction of

tooth substance to the minimum, be non-irritating to the adjacent tissue, natural in appearance, strong enough to resist the strain of mastication and capable of being quickly constructed.

The only apparent manner in which a stump that is properly crowned can be lost is by disease in connection with the periosteum.

Crowning should not be attempted when the tooth is very loose, necrosed, exostosed, or surrounded with unhealthy gum.

It will be found impossible to adapt a collar or cap crown in cases where the natural crown has been broken away for some time and the adjacent teeth have moved so as to form a triangular space, the base being towards the gum.

In England, it has been taught that in cases where the foramen at the apex of the root is widely patent such as in immature teeth, crowns could not be satisfactorily applied, but practical experience has proved this to be an error.

You are most of you aware that I teach that a *chronic* abscess, in connection with a broken-down tooth, discharging itself through a fistulous opening, that shows no tendency to yield to treatment by medication will often rapidly disperse, where the canal is filled and the stump crowned and bitten on.

The probable cause of the abscess is Nature's abhorrence of an useless member, therefore the broken-down tooth acts as a source of chronic irritation to the adjacent tissues, but when crowned and bitten on it again coming into use the surrounding part is stimulated and the inflammatory products are re-absorbed.

As an instance I might mention a case communicated to me by our esteemed late House-Surgeon, Mr. Fisk.

At the beginning of last winter, Mr. Fisk at my suggestion crowned a broken-down tooth having a chronic abscess in connection with it that had not shown the least improvement after several weeks of dressing. About two weeks after crowning, the abscess had disappeared. In the summer the patient returned with a very swollen face, reporting the crown to have come away a few days previous; it was replaced and swelling rapidly subsided. When a bicuspid or molar is broken down and has a living unexposed pulp, it will usually be best to apply an all gold cap, as then very little tooth tissue need be removed, but in such cases the pulp is very liable to die.

If the pulp be dead and there is sufficient tooth substance standing to hold the rubber dam, apply it ; should it be very much broken down, dress off the enamel and shape the root as for a collar, then make a band of thin metal to fit, and use this to hold the rubber dam. The rubber dam having been applied open the mouth of the pulp chamber and cut away all the dentine that forms the constriction at the neck, but do not drill out the canals, the perfect reaming out of canals is in most cases an impossibility, owing to their irregular shape and direction. Also there is a chance of perforating the side or driving septic matter through the apex, and moreover the stump is weakened.

Any part of the constriction left, acts as a scraper removing particles of debris from the bristle as it is withdrawn.

In filling the root this septic matter will be pushed to the extreme apex.

Having cut away the constriction at the neck and thus formed the canal into a funnel, remove all debris of pulp and tooth, then syringe the canals out with an antiseptic wash. Very fine bristles, roughened with a file to hold a strain of cotton, should be worked up and down the canals to thoroughly clean them.

The canals having been well washed out, should be dried and filled with a material of low conducting power, which can be easily introduced and will form a solid filling at the apex.

Gutta-percha and oxychloride of zinc are useful for filling roots.

Dr. Whitten, of Boston, states that oxychloride of zinc turns any remains of pulp to leather. He introduces it on a fine bristle, at first very thin, gradually using it thicker as the root is filled until at last he introduces the pure powder.

I have modified his method in finishing by introducing a gutta-percha cone, which acts as a piston on the soft oxychloride of zinc, thus filling all small spaces.

Oxychloride of zinc is very useful in cases of irregular shaped roots where it is impossible to remove the pulp thoroughly but for ordinary cases dissolved gutta percha and gutta percha cones are best.

The cones should be made as wanted, and then they will be about the size of the canal, and the full piston action is obtained.

The canals having been filled the upstanding remains of

the tooth is cut away. The greater part of this is readily removed by using a drill Messrs. Ash & Sons have made me, it is simply a long fissure bur with a chisel point.

Two holes are made with the point from the labial to the lingual surface, one at the mesial the other at the distal part of the tooth. The tissue between these holes is now cut away with the fissure part of the drill, then one blade of a pair of excising forceps is placed in the labial, and the other in the lingual opening, the handles are pressed together, and the crown comes away.

The above is the method employed in California when felling large trees.

If a crown that solely depends for its support on the dowel is to be applied, cut the stump down to a point a little beneath the gum margin, then it will not be so likely to decay by decomposition of saliva and other substances.

When a gold cap is to be used the stump may be left, standing well above the gum margin, but the sides must be made parallel.

Should a crown with a collar be applied, cut the stump away at the labio-cervical margin to a point a little beneath the gum edge. It may be left standing above the gum at the lingual surface slightly.

In order that the collar may fit the root closely all the way down, the sides of the stump should be made parallel. This is best accomplished by paring off the enamel all around the stumps with chisels.

Dr. Whitten's broken back and Dr. Bennett's Nos. 5 & 6 are useful for this purpose. The enamel having been trimmed off finish shaping the stump with a safety point shouldered fissure bur.

If the stump is shaped cone-like the collar will stretch and thus become loose every time it is removed in fitting, and it may be driven past the portion trimmed, when the projecting edge will be a source of constant irritation to the surrounding tissue. Moreover the ledge thus formed will permit of the accumulation of decomposing secretions. A dowel on no account need be of greater length than half an inch.

When using a metal-backed tooth in crowning an incisor or canine it is advisable in preparing the root for the dowel to cut as far as possible in the lingual aspect of the canal, as by this means the head of the dowel will be embedded in the solder and thus be more strongly fixed to the cap.

When using a Logan dowel prepare the pulp-canal with a conical drill similar in shape.

If the crown is to be a simple dowel crown, previous to taking an impression shape a piece of wood like the dowel, and place this in the pulp-canal, removing it with the impression. For a gold cap or collar crown an impression is best taken as follows :—

Take a strip of telephone metal and fit it to the stump as if about to make a collar of that material. When it is roughly fitted place it upon the stump and take an impression by the patient biting into a piece of modelling composition or wax. When quite hard remove this from the mouth and cast in plaster, with the little band in position.

The following are the best metals for crowning.

Coin gold for gold cusps and bicuspid and molar bands. Green gold for incisor and canine collars.

Soft platinum for incisor and canine collar tops. Crowning metal one side gold and the other platinum for bicuspid and molar bands and backing certain teeth.

Fit coin gold bands roughly to the model obtained with the little telephone plate and fine fit them in the mouth.

All fitting of green gold collars should be done in the mouth. In soldering a band or collar always have the join at the lingual part, and solder edge to edge. If the join is lapped there is always a point where it does not fit the stump.

The best clamp is a piece of binding wire. Do not mallet bands or collars on, if the stump is properly shaped and the band is the right size it will go on far better without the mallet.

In trimming a collar down at the labio-cervical margin always leave a little extra height for final drawing home. The edge of a collar or band should as far as possible conform to the alveolar margin.

To make the surface of a collar to which the top is to be fastened flat, use a flat file.

To prevent bands and collars bending in filing, fill them with composition.

In soldering on tops use as little solder as possible, place it on the outer edge and on a soldering gridiron solder over a Bunsen flame.

The circumference of a tube tooth should be slightly larger than the cap it is to be fixed to, after fixing grind it to the same size.

The edge of a flat tooth should project just over the labio-cervical edge of the cap, but this overhanging part must be all cut away after soldering.

Back the porcelain with gold when the teeth are of a yellow shade, and with crowning metal with the platinum towards the porcelain when of a bluish tint.

Often for strength when backing a frontal or lateral tooth, it is as well to grind the porcelain away at the cutting edge to a gradual slant and carry the back up to the extreme edge. Occasionally on account of darkening the colour this should not be done but the backing cut away nearly to the pins.

In such cases a flat should not usually have been used but a tube tooth. When making a bicuspid or molar faced crown, the backing should be carried over the cutting and the cervical edges.

The pin surface of a saddle-back tooth should be ground flat with a safety edge stone, before being backed. In backing the pins should be bent inwards as they are not in the way at the labio-cervical edge.

Specimens I exhibit will illustrate the preceding points better than a fuller description. The band to which the saddle-back tooth is soldered should be cut down to a gradual slope from the lingual surface to the labio-cervical margin with a flat file.

To obtain the cusps for a gold crown either place the band on the stump and fill it with composition, or wax, which is then bitten into. The bands and contents are now removed and cusps are carved in this composition or wax, an impression of which is taken in moldine and cast in fusible metal and the die thus obtained is used to strike up the cusps; or my own method which I find much more expeditious is to strike up cusps in Messrs. S. S. White's dies and knock down the places bitten on with blunt punches. This avoids the unsightly appearance produced when in grinding gold cusps to the bite, the solder is exposed and thus rendered liable to discolouration.

Fix all crowns by horizontally grooving the pulp chamber and notching the dowel if one is used; dry out the canal and fill it and the interior of the crown with oxyphosphate of a creamy consistency. Drive the crown home with a notched tooth-brush handle, and one or two light blows with a lead mallet.

When the setting is quite hard trim away all surplus of cement with Dr. Whitten's broken-back chisel.

DENTAL EDUCATION.

By MR. BRIAULT.

MR. PRESIDENT AND GENTLEMEN,

I venture to bring before your notice this evening the subject of "Dental Education" as one of vital import to us all, and at the same time one, into the discussion of which we can individually enter with a feeling of personal interest; and it is with the object of promoting such a discussion that this paper has been written.

It is difficult to find anything fresh to say on a topic that has been so freely discussed, point after point of which has been so carefully debated, and as I have no "Ideal Scheme of Education" to lay before you, I must content myself by pointing out some few items in the present system that appear to me, as a student, to be somewhat curious if not anomalous. Our Education is naturally divided into two parts,—First, our General Education, of which the preliminary examination required of the student is a test, and second, our Professional Education, tested by the Examining Board of the Royal College of Surgeons at the end of our hospital career.

Now, having reference to our General Education; although the student can become registered by passing a piecemeal Examination that can scarcely be looked upon as a distinction, yet it behoves all students to aim as high as possible in regard to the standard of their preliminary, too high, they cannot aim, for, we must remember our fellow men are not in a position to judge of our Professional Education, and consequently they judge us by our General Education, upon the extent of which will depend in a large measure our status in society and the fact of our being an honour or a discredit to our profession. We must not forget that our education does not cease on our leaving school or the hospital, for at that time we have but the foundation of the superstructure which we must ourselves afterwards rear, that superstructure should combine solidity with ornament. There is an old rhyme which runs thus:—

"If every one would see to his own reformation
How easily you might reform a nation."

*A paper read before the Students' Society, London Dental Hospital.

Similarly if we each pay attention to our individual education, (and as Sir Walter Scott and Gibbon both point out, the best part of every man's education is that which he gives himself,) we shall soon bring about the much wished for reform in our profession and rapidly raise it to that high status which we all desire to see it hold.

Passing to the Mechanical training of the student, which is the earliest and perhaps the weakest part of his Professional Education, and a part that should either be altered or considerably supplemented by additional training at the Hospital.

Under the present *regime* some of us, may, during our apprenticeship acquire all the knowledge and practice that is desirable. But a large number are less fortunate; for example, a student may be with an old fashioned practitioner who has not kept up with the times and is consequently unable to teach his pupil many of the later and improved methods of work, or he may be with a man whose practice is not high class, and consequently he is compelled to do poor work, the result being, that at the end of his time, he has no better idea of good work than when he commenced. On the other hand, the training of those of us who are fortunate enough to see good work done is often left in the hands of a mechanic, who cares little or nothing, whether we acquire proficiency or no, and too often looks on the artieled pupil as a nuisance; or perhaps he may take an interest in us and keep us throwing off his models and attending to inferior details with useless and wearisome monotony, during the whole of the three years we are under his care, never dreaming of allowing us to do more important work, for fear of an unsatisfactory result. This may seem an overdrawn case, but one of our late House surgeons told me that he was never allowed to do any of the best work during his apprenticeship, and too often spent his time running errands or engaged in other menial employments. Even supposing the pupil to have had an intelligent and painstaking teacher and plenty of practice. How often has he had an opportunity of taking models and bites and fitting work in the mouth? As a rule, a model has been brought to him, with instructions how the case is to be made, without his being told why, and even if he is told, he is often unable to appreciate the reasons, since he has not seen the patient's mouth. And by some practitioners cases are not uncommonly made, to suit the patient's means rather than the patient's mouth. Is it not unfortunately true that men are

launched on the public as qualified Dentists on the strength of certain dissections performed and lectures attended without ever having fitted a denture in the mouth?

Now this is a somewhat sad state of matters, and one which I think lies with the Dental Schools to alter.

Students must be taught this part of their work somewhere. It is not to be expected that practitioners will care for their patients to be made the subjects of the pupil's first attempts and this being the case we must look to the hospitals for the patients and the practice.

The chief reasons urged against mechanical work being done at the Hospital appear to be, Firstly, the difficulty in determining who are fit patients to be supplied by the Dental Schools with artificial dentures and Secondly, who should defray the expense; whilst again there seems to be a fear, that if the hospitals undertook such work, they would in many instances deprive young practitioners of cases on which they frequently rely to give them a start in life. Now I think without interfering with the vested interests of these young dentists, we can find in the Army, Navy and the Workhouses, patients to whom such work is an absolute necessity, which should be provided for them by the country and from the same funds which now supplies them with medical and surgical attendance.

In the case of the Army and Navy, we are aware that the State exercises the greatest care for and is particularly anxious that, the health of our soldiers and sailors should be preserved at the highest possible level. Whilst fully recognising that the efficient soldier or sailor is a costly individual to the state, yet, in this age, when the value of good sound masticatory mechanism is so fully acknowledged as a means of retaining health, such an arrangement as is here suggested might be worth the careful consideration of our Military and Naval authorities, a point altogether outside the value of such a field of practice for our Students. Before finishing the subject of the Mechanical Training of the pupil, I should like to call attention to a curious regulation, which exists with regard to qualified surgeons who wish to practise dentistry. It appears that these gentlemen are only required to undergo two years mechanical training, instead of three which are required of the ordinary student whether he intends to become a surgeon or no. Why this is so, does not appear unless the knowledge of Medicine, Midwifery, and Surgery may be supposed to assist a

man in the difficulties he may meet with in his mechanical cases.

We now pass on to the student's career at the Hospital, where he will probably find, if his experience is the same as mine many things to perplex him. One of the first of these will be, the different instruments he will receive from different surgeons, one will tell him that for his cohesive gold fillings he should use nothing but tape and never cylinders, while the next surgeon who finds him using tape, will probably ask him why he wastes his time putting in tape when cylinders will make an equally good filling, or again one will advise the use of separators, another condemn them, and so on.

I think that these difficulties would to a large extent disappear, if there were a definite method of Hospital Practice laid down, and when that had been acquired, the various methods of other operators might be seen and practised at the student's option.

Another difficulty will probably be found in the extensive curriculum presented for the student; especially when he remembers that he may, at his examination be questioned upon any part of that curriculum, which I think none will venture to say can be thoroughly prepared in two years, seeing that it is nearly as extensive as that required for the license of the Conjoint Board.

When the student commences his reading he will find some difficulty in picking suitable text books for the general subjects, since most of them contain far more than he requires, and most probably his lectures will not have pointed out to him what to read, and what not to read, for many of them will have covered sufficient ground for the Fellowship or London M.B.

Or, perhaps, the lecturer on surgery will inform him that as the subject of surgery is so extensive he cannot go over more than half of the work in the session, and that half may consist for the greater part of the surgical subjects that do not come in his curriculum, while such subjects as do are not touched on at all or only slightly; this is what has actually occurred this session at a general hospital that makes special provisions to suit the requirements of dental students. I think it would be a great boon to all concerned, if a more definite curriculum were laid down for our student, and if one of the general hospitals could find it convenient to hold classes

in surgery and anatomy suited for students entering for the L.D.S. while the course of lectures on materia medica might be given at the Dental Hospital.

Another point that seems perplexing is, why are we not allowed to learn by practical experience to administer nitrous oxide gas? Probably I shall be told that as dentists we have no right to administer it, but should always have a surgeon to do so for us. I am sorry to say that even in the short experience of three months duty, as *locum tenens*, in different practices I found it the exception rather than the rule to get a surgeon who understood how to administer it.

Then again other circumstances often compel the dentist to do the duties himself, and this being well known to be the case, it seems rather strange that students should not be allowed some practice in the administration of anæsthetics at the hospital.

Some will say that many of the difficulties with regard to the work at the general hospital may be overcome by taking the membership of the College of Surgeons. Now if a student takes this additional diploma, it will, I think, be granted that unless he has exceptionally brilliant abilities, he will find it difficult to obtain the double diploma, and at the same time become a good operator within a period of four years. Indeed, a student of moderate ability will be almost unable to do so in the time, for the greater part of his first two years which he should devote to practical work at the Dental, he is compelled to spend at the General Hospital in order to pass his primary membership. What is the result?

He leaves the hospitals with operative skill very greatly inferior to that which he might have acquired had he devoted his whole time to that work which is so essential to him in the practice of his chosen profession, which his general surgical work will not improbably teach him to despise. What has he in return? An additional knowledge, that will help him little or nothing in his dental work, and, some say, a better social standing, which is, I think, a point open to question. That the extra qualification is not worth the time, trouble, and money necessary to obtain it, is the opinion of many, and among them a late house surgeon of this Hospitals and a late Saunders' scholar.

Whatever opinions on the subject may exist, one thing is certain, and that is, if we despise the diploma which we utilise as a license to practice with, we cannot expect the outside

public to respect it, and if it is not a perfect qualification for profession, it is time it should be abolished and one instituted that would fulfil its purpose more completely. But it will be generally admitted that the examination for the Diploma at present leaves little to be desired, except that it might be advantageously divided into two parts, as it is in Glasgow and Edinburgh. Also it would be more satisfactory if the practical part of the examination were allowed to bear a higher mark value than it does now. For practical ability, is after all, the essential qualification of a skilled and successful practitioner.

In conclusion, it is not to additional medical qualifications that we should look to raise our status, but to a general education and training that shall give us those characteristics which shall make us worthy of the time-honoured appellation of gentlemen, "to possess which characteristics" says Smiles, "is a dignity itself, commanding the instinctive homage of every generous mind."

"Who comprehends his trust and to the same
Keeps faithful with a singleness of aim,
And, therefore, does not stoop or lie in wait
For wealth or honour or for worldly state,
Whom they must follow on whose head must fall,
Like showers of manna, if they come at all."

TRANSMISSION OF DISEASE BY BRUSHES AND DENTAL INSTRUMENTS.—A discussion recently took place at the Conseil d'Hygiène concerning the transmission of certain diseases by hairdressers and dentists, the brushes and instruments being used in common for all their clients. M. Lancereaux wished to have stringent measures enforced, and cited a case of phthisis which Dr. Cochrane, an American dentist, alleged was transmitted by a dentist's instrument. M. Dujardin-Beaumetz and others declared that there were great difficulties in the way, but recommended great care in schools and public institutions.

THE Ivory separator is said to be a useful instrument, and well worth a place in every dentist's outfit.

British Journal of Dental Science

LONDON, DECEMBER 2nd, 1889.

THE ALTERATIONS IN THE L.D.S. CURRICULUM.

THE new regulations which we print *in extenso* in another column show a distinct step in advance towards making all dental students take the double qualification of M.R.C.S., L.R.C.P., as well as the L.D.S. They make some very trenchant changes, and deserve the most careful study. Not only in the course of study prescribed, but also in the character of the examination to be passed are alterations made, and in the latter case they are made in the direction of treating the subject more from the practical stand-point. Thus at the Practical Examination, candidates may be examined (*a*) on treatment of dental caries, and be required to prepare and fill cavities with gold or plastic filling, or may be required to do any other dental operation : (*b*) on the treatment (mechanical and surgical) of the various irregularities of children's teeth : (*c*) on mechanical dentistry. The changes which have been made in the curriculum are such as make the first part of the dental student's work practically identical with that of the ordinary medical student preparing for the first professional of the examination under the conjoint board for the M.R.C.S., L.R.C.P., thus the dental student may study his chemistry, practical chemistry, and materia medica before registration ; the three years mechanical work also may be done before registration, but four years of professional work will be required after registration ; instead of two courses of anatomy lectures, one will now suffice, but twelve months dissection is obligatory in place of the nine months heretofore

required. A three months course of Practical Physiology is further insisted upon under the new rules. We thus see the alterations group themselves under two classes. 1st, Those which approximate the dental curriculum to the medical, and 2nd, those which extend the examination so as to introduce more practical work. These two directions of extension are highly important, as they balance the one the other. For while the opponents of the scheme, which we have consistently recommended our readers for several years past, that L.D.S. men shall also take a medical and surgical qualification—the M.R.C.S., L.R.C.P., or an equivalent, contend that it induces scamping of the dental work proper, the present alterations in the examinations enforces upon candidates the necessity of making themselves proficient in practical work, and so answer the allegation that if you make your dental student a surgeon, you spoil him for a dentist. Of course it is open to the opponents of the scheme to say the average student cannot do as much, and will either fail again and again, or get through his qualifying examination by a fluke, and be alike unskilled as a dentist and valueless as a medical man. In point of fact, however, neither of these contentions has been shown to be true, in spite of the fact that for some years past there have been a large percentage of students who have set themselves the task of obtaining the triple qualification. It must also be remembered that at the London hospitals the dentists who have obtained the appointments have been men who in addition to the L.D.S. hold either the M.R.C.S., or F.R.C.S., or some other of the higher qualifications, and we are not aware that these gentlemen are as a class less efficient dentists than their neighbours who hold the L.D.S. only. Whether the future will show that while the few can take double and triple qualifications the ruck of dental students will find additional impositions of work insufferable, and themselves overweighted by them, we have yet to learn, but of this we may be assured that owing to the wise alterations in the L.D.S. examinations which insist upon proof of practical proficiency, our students will be turned back from the portal

to their profession unless they can satisfy their examiners that not only are they theoretical, but also practical dentists. It seems to us that if the practical examination be really carried out in the spirit, as well as the letter, of the new regulations, there need be no fear of candidates running amuck through their final tests while yet possessing little sound professional knowledge. A further thought suggested by the perusal of the new regulations is that as dental students will, when they come into force, be placed practically upon the same footing as medical students at least for the first part of their career, but little additional expenditure of time and money will enable them to achieve the triple qualifications of M.R.C.S., L.R.C.P., and L.D.S. We do not think that any proof at present exists in support of the unpracticalness of double qualification men, and unless we are very falsely informed by surgical and dental examiners alike, the men coming up for examination for the L.D.S. only, are often badly prepared and give unmistakable signs of cramming, whereas those who have the longer and severer strain imposed upon them by the anticipation of further examinations are more careful to ensure passing.

DENTITION IN UTERO.—A correspondent to *The Lancet* says,—I beg to say that I was called in to-day to remove two lower incisors from the mouth of an infant, aged twenty-two days. They were there at birth, and had become so prominent and loose that the mother was anxious to have them removed. I enclose them with this letter, and may add that it is by no means the first case in my experience.

A COLLODION FOR THE TEETH.—The application is best made on cotton wool. Acetate of Morphine, gr. $\frac{3}{4}$; essence of peppermint, m. iv.; carbolic acid, pure m. xx. collodion to a drachm. Of course the user must be careful not to overdo the morphine.

THE DENTAL HOSPITAL OF LONDON.—Sir Richard Webster, Q.C., M.P., Attorney-General, has accepted the office of vice-president to the Dental Hospital of London, Leicester Square.

CEMENTING METAL TO GLASS.—Take two parts finely powdered white litharge, and one part dry white lead, mix intimately, and work up with boiled linseed oil and lac copal to a stiff dough. One part of copal is taken to three parts of boiled oil, and enough litharge and white lead added to make a dough similar to putty. The underside of the metal is filled with the cement, and then pressed upon the glass, the excess of cement being scraped off with any sort of instrument.

A LIBRARY FOR THE STUDENTS' SOCIETY, MANCHESTER.—Mr. David Headridge, the Librarian and Curator, writes, —In connection with the above Society, there has been gradually developing from local generosity a library and museum. With an object of further increasing their manifest usefulness, a wider appeal is now justified in being made, not only on account of the increased number of students, but the library, though consisting of standard works, numbers yet merely some few copies. Therefore all gifts of books, pathological specimens, casts, photos, old instruments, wolrabs, bottles, &c., will be most welcome to the council, and on its behalf I shall be most happy to acknowledge the receipt.

TREATMENT OF CHRONIC ALVEOLAR ABSCESS.—In the treatment of chronic alveolar abscess, Dr. R. B. Adair, according to the *International Dental Journal*, uses a delicate bulb made of platinum and slightly curved at the end, so as to follow the track ; the point is heated to red heat, and pressed on a stick of nitrate of silver, which adheres to the point and hardens ; this is carried to the bottom of the abscess, and turned around so as to cauterize the edge of necrosed bone, destroy micro-organisms, and stimulate to healthy action.

Nose Trouble from Unerupted Central Incisor.—At the Georgia State Meeting, Dr. S. A. White reported the case of a child brought to him suffering from a very sore nose, with a very painful protuberance in one nostril. Examining the teeth, he found the right lateral and the left central incisor touching, with no trace of the right central and no room for it. The teeth being separated, in a short time the soreness of the nose diminished, the protuberance disappeared, and the missing central incisor came down all right into place.

A DENTAL LABORATORY.—A dental laboratory is being built, says *Guys Hospital Gazette*, on a site immediately fronting the conservation room, and it is expected that it will soon be ready for use. The room will be more than 22 feet long, and will be lit from the front by four windows already prepared, and from above by small “sky-lights” over the lathe, the casting bench, and the plaster bench. In front of the windows jeweller’s benches will be arranged, at which about twelve students can work at the same time. There will be all the necessary appliances for casting in metals and in plaster of Paris, vulcanizing, plate-making, gilding, and the numerous arts included under “Dental Mechanics,” which every student is supposed to have learnt during his three years of pupilage before entering Hospital. Students will thus be able to construct for their own use “Correction plates,” necessary for the treatment of dental irregularities and oral deformities. Demonstrations will from time to time be given on the construction of metal and vulcanite splints used in the treatment of fractures of the maxilla and in the preparation of obturators and vels. The laboratory will afford the means of supplementing the lectures on Dental Mechanics by practical instruction.

At the recent examination under the Conjoint Board, Mr. W. A. Horton, L.D.S., passed his final examination for the M.R.C.S., L.R.C.P., diploma.

Abstracts of British & Foreign Journals.

DENTAL COSMOS.

THE FACE.

By A. H. THOMPSON D.D.S. Topeka, Kansas.

FACES grow refined as the mind develops. The person devoted to an intellectual life reflects that life in his face. The best examples of this development are found, of course, in those in whom the natural bent of the mind is favourable to such influences. Where it is unfavourable, the best of influences make but little impression. Heredity has much to do with facial beauty and refinement. Generations of cultured associations and education produce faces of innate refinement and spirituality. If the course of such a life in a family is uninterrupted, it will lead more and more to beauty and refinement of features. But it is, unfortunately, rarely uninterrupted. There is degeneration in nearly every generation, either through crossing with coarser stock, or lack of education or moral influences or cultured associations, or the demoralizing effects of dissipation or low pursuits. Hence coarse and refined faces occur side by side in the best of families, and often also in the worst. The law of atavism will account for a low and brutal mind, a "black sheep," in the best of families, or of a refined individual in an uneducated and coarse family,—the reappearance of former conditions. The birth of the emotions is a great step forward in the development of the face. A high intellectuality alone will not make a refined and beautiful face. Noble impulses of great minds come from good hearts that prompt them to say and do great things for mankind. With the greatest men of the world, as well as in ordinary life, it is the man who is kindest and best that has the most influence with his fellows. The growth of the good and elevating emotions has a refining effect upon the face and measurably atones for the absence of education or mental strength, which sometimes weakens a face. Good emotions are, in fact, the main factors of spiritual beauty; but as the animal selfishness which we have inherited from our savage ancestors is yet the mainspring of most of our actions, it

is little wonder that there are few faces that are beautified by this reflected unselfishness. The struggle for existence in our selfish commercial life is quite as fierce as in the days of the mere physical struggles of our ancestors: the fittest in physical prowess survived then, and the fittest in commercial shrewdness survive now. There is the difference, however, that the unfit are cared for to some extent by the more fortunate in our day, especially when intellectually or spiritually superior. But the financial conflict and the grinding care this conflict brings upon all classes, weighs down the minds of men and furrows the face with lines. And yet there are some beautiful and spiritual faces to-day,—the reflection of lofty minds and souls on which the sordid cares and anxieties and selfishness of life seem to have had little effect. But the faces worth looking at and analyzing occur as rare oases in the desert of mediocrity around us, and serve but to redeem the mass from total condemnation. Although the majority of faces as we meet them are hopelessly mediocre and some even repulsive, such as they are it is our professional duty to study them, by reason of the relation of dental science to the outward face and the effect of our art upon it. Our work often has a perceptible effect upon the features, and some branches of it, especially orthodontia and prosthesis, often cause a revolution in the expression of the face. Dentists have powers to alter even the mediocrity which we daily meet, and the effect of our operations upon a fine and sensitive face is too often startling. So few faces have any visible soul in them that the attempt to produce any artistic effect is disappointing and disheartening. This is one unrecognized source of the low grade of artistic prosthesis that prevails,—*i.e.*, expressionless faces cannot be reanimated by any resource of our art, and by our failures we are discouraged, when the cause of our failure is really not lack of skill. The anatomical relations of the face are very simple, and beauty, so far as dental resources and the influences of our art are concerned, depends largely upon its mechanical elements. There is to be considered the proper proportion of the different sections and areas of the face, the exact proportion and harmony of the features, the proper amount, without excess, of upholstering and padding by adipose tissue, the texture and colour of the skin, etc. From the mechanical stand-point the main elements of beauty are proportion, contour, and colour, and from this basis the dentist must view the face, for his resources are

purely mechanical. He might like to put more soul into a dull face by way of completing it, after he has done his artistic duty, but he cannot do it. From the stand-point of the mere artistic mechanics of the subject, when we study the faces we meet in practice, we observe that there are very few that are properly proportioned according to exact rules, that most faces are more or less asymmetrical, and that facial deformity is the rule. It is the exception to see a face in which the features are in harmony and proportion. This is probably largely due to the heterogeneous mixture of races and types. This racial intermixture prevails so extensively in this country that inharmonious features crop out in many faces, and are out of harmony because of a very different type. Or, again, two or more types may be represented in a single face. A feature may be fine enough of itself, but if of a different type from the rest of the face it is out of harmony and becomes a deformity, whereas if it were set in the midst of harmonious features of its own type it would be beautiful. For instance, the nose is often out of harmony with the remainder of the face, being either too large or too small, or of such shape or expression as to be out of all relation to the prevailing type of the face, and that in that setting it is a deformity. The mouth, also, is often inharmonious. A thick-lipped, sensual mouth set in the midst of a refined, spiritual face strikes all observers as being a ludicrous combination. A weak and receding chin accompanying a strong upper face is painfully incongruous; but in the male sex such a deformity can be concealed by the beard, which often gives a face a dignity it would not otherwise have. Nearly all faces have one, two, or more features of different types from the prevailing type of the face. Much depends upon contour for beauty of the face. This beauty of contour is produced by adipose tissue, and as age progresses this disappears, the features shrink and lose their expression, the muscles become less mobile, the skin loses its youthful colour and texture, and as the years toll off the face assumes more and more the shape of the bony framework beneath, betraying approaching dissolution. Then again, the experience of the years leaves its marks. Disease may also cause the face to shrink prematurely and reduce the contour by emaciation. This, however, is usually corrected on the restoration of health by the redeposit of fat, except in the case of chronic disease and insufficient nourishment of the tissues. Contour

is a principal element of beauty, in a mechanical and artistic sense, and, other things being equal, the plump face is the most agreeable and attractive. A certain amount of fullness, or tissue body, is necessary for the proper support of expression, for shrivelled features cannot be expressive and active in conveying the workings of the mind. Therefore, in the restoration of expression, within the limits of his art, which is altogether mechanical in its effect, the dentist has in view the plumping of the shrunken face with the object of restoring the features to their proper contour. There are many abnormal causes of facial deformity, and among these dental irregularity stands prominent. On account of insufficient room or other causes, the incisors may be crowded and forced forward, thrusting out the lips and producing an abnormal expression of the mouth. Or a V-shaped jaw may mar the strength of a face and give it an imbecile cast. Or the cuspids, by erupting forward of the dental line, may give a ferocious expression to a mild face. Premature extraction of teeth may lead to contraction of the jaw and asymmetrical development of the face. The removal of the cuspids causes a depression in the line of the canine eminence and a sinking of the face quite up to the alæ of the nose, with a consequent destruction of symmetry. Many other forms of dental irregularity affect the features and mar the beauty and symmetry of the face in greater or less degree. Disease often has a directly deforming effect also. Thus, hypertrophy of the tonsils is sometimes accompanied by mouth-breathing and compression of the alæ of the nose and narrowing of the bicuspid region of the face, thus producing an abnormal conformation. Nasal catarrh sometimes causes distention of the nose, with disagreeable disturbance of the harmony of the face. Affections of the breathing apparatus causing distress and effort in breathing lead to distressed expression and straining of the features, and may produce permanent contortions from spasms. Chronic diseases of other organs, especially of the heart or stomach, often give rise to peculiar expressions of distress or anxiety, which may be pathognomonic. Nervous diseases, paralysis, etc., of course, often have a direct effect in producing contortions of the features, and physical pain from any source is always indicated by the faithful reflector. But yet again we sometimes see persons in whom prolonged suffering and an invalid life lead to such serenity of mind by the contemplation of lofty themes and the cultivation of religious devotion and

resignation, as to ennoble and spiritualize the face and give it a mysterious and wonderful beauty. There are exceptions, of course, to the average, for as a rule the cruel hand of pain scars the face with the two evident signs of its presence. Suffering, indeed, usually alters the whole character of the individual and makes him better or worse. It lowers or elevates the soul, and the face reflects the changes. But let us turn from these disagreeable considerations to the contemplation of the beauties of the face for their own sake. Beauty everywhere is for enjoyment. Nature created beauty to excite pleasurable emotions. It never ministers to misery or pain. So, indeed, a beautiful face is created to be admired and enjoyed. The first thing that strikes us favourably in a face, is exactness of proportion, and then harmony of the features, whatever the type. These give pleasure to our artistic sense, be it crude or cultivated, for the artistic sense is innate in all men.

SOME METHODS OF REGULATING TEETH.

By V. H. JACKSON, M.D., D.D.S., New York.

In studying models of the jaws where the teeth are much crowded, to determine whether the arch should be expanded or extraction resorted to, and in some cases before deciding on any method of moving the teeth, it is well to prepare an extra model from an impression, and after carving the teeth cut those to be moved from the model with a knife or a small disk saw attached to the dental engine, and again attach them to the model in the position it is desired that they shall assume when regulated. The dividers may be used to advantage in spacing the arch. Where one or more springs are to be used, their shape and position on the model can be best determined by bending soft copper wires and attaching them in position with wax, especially if several are to be used, as their action and relationship can thus be seen at a glance. The writer has for some time used very satisfactorily a method of uniting two or more pieces of piano-wire to form appliances to be used independently for regulating, and for uniting piano-wire to gold, copper, silver, and other metals. In uniting piano-wire it can be left round, or flattened by the use of the hammer, file, or corundum-stone, and the parts to be united made

bright with emery-cloth, and held together temporarily by cord at one or more places. The parts joining are then bound tightly from end to end with a fine binding-wire of copper, iron, or platinum. The part bound is then soldered with soft solder by warming it with a spirit-lamp, and laying on pieces of solder, the surface having been covered with muriate of zinc. It is found, however, that tin is preferable, as it remains bright in the mouth, and can be used in the place of solder, except where gold or silver are used. Or the appliances may be immersed in the molten metal, tinning the whole apparatus at the same time. The temper of the steel is not materially changed by the process of tinning. Iron binding wire has been used in the mouth for months, but is very liable to corrode, even though well tinned. The smaller-sized copper wire has been used more satisfactorily, as it is more easily worked, and does not corrode. Tin or solder unites with it freely. A very nice finish to the joint can be made by rolling a small-sized copper wire very thin and using it in the same manner. To bring the cuspid teeth in line where they are too prominent or entirely outside of the normal line of the arch, the lateral incisor on one or both sides being nearly in contact with the first bicuspid, whether the cuspid be fully erupted or just pointing through the gum. In the latter case it will be admitted that it is the proper time to move the cuspid into line, if an appliance can be so constructed and adapted as to move it to place without causing more inflammation, and more inconvenience to the patient than it would if more fully erupted. Across the model of the arch to be corrected place a piece of piano-wire, about No. 20 gauge, between the lateral and first bicuspid, on either side if both cuspids are to be moved, and bend to follow the curve of the roof of the mouth between those points. If there is insufficient room for the wire to pass between the teeth, they should be separated by wedging until one wire can pass freely. The ends of the wire are then curved forward and bent back on it, forming a loop on either end of sufficient size and depth to surround the cuspid and pass again between the lateral and bicuspid, with the ends cut off about $\frac{1}{8}$ inch from the lateral. The looped end of the wire when spread forms a spring which will separate the lateral from the bicuspid, making a space for the cuspid. The end of the loop is to be bent upward, forming an additional spring that bears on the cuspid and forces it into line as space is being made for it. If it is found in

studying the model, that any portion of the arch back of the cuspid should be spread, to assist in correcting the irregularity or to improve the articulation of the teeth, another wire is adjusted to accompany the former one across the arch to the palatal surface of the bicuspid, and bent backward following the line of the gum beyond the teeth to be moved and the end curved up on to the grinding surface at any place that will not interfere with the articulation, to keep the wire from pressing on the gum when in use. This portion of the appliance forms a spring, and when spread will force the teeth outward, enlarging the arch as desired. If it is found more practical to remove either of the bicuspid, to give space for the cuspid, the portion of the appliance last described may extend beyond one or more molars and terminate in a clasp around a tooth that will assist in drawing the bicuspid backward. The two wires mentioned are then bound together with the binding-wire and tinned. The appliance is best retained by placing a gold band with a groove on its surface on on one or more teeth on either side of the arch. The lateral incisors are usually chosen. After the smooth bands are fitted the appliance is placed in position, and the bands marked below its line of contact. The bands are then removed, and the smaller sized platinum wire is fitted to the marked portion and soldered to form the groove. The band is then fastened to the tooth with oxyphosphate cement. If the appliance is not well retained, bands may be placed on the bicuspid or other teeth as needed. If the lateral incisors are to be moved a considerable distance or require turning forward, a lug may be soldered to the palatal surface of the band, and project back of the central incisor. If all the incisors are to be carried forward, a thin bar may unite the lateral incisors back of the centrals. Similar appliances to those above described may be used for making room and forcing prominent lower cuspid into line. Then the wire should follow the curve of the arch back of the lower incisors, passing between the laterals and first bicuspid, forming a loop by curving backward, and preferably be retained by bands. If the arch is not to be spread laterally, or the position of the bicuspid changed; the first wire crossing the arch can be used alone in many cases by employing bands on the lateral incisors and the first bicuspid; or two wires may cross the arch, with the ends of one curved so as to encircle the cuspid, and the wires separated to act as a spring to gain the space required. If but one cuspid is out

of the arch, a gold band is placed on the opposite one, or on a bicuspid, with either an eye or a tube soldered on the palatal side, into which the wire, bent at right angles, can hook, and thus be held firm, and the other end is formed and held as before. The appliance can be removed when more pressure is needed, and changed at any point with the clasp-penders. The richer spring metals will not be found to be so effective, but if used with the above method a flat piece of gold, or gold and iridium, should cross the roof of the mouth in place of the wires described, with the spring wire soldered to it to form the springs mentioned.

Reports of Societies.

THE MANCHESTER ODONTOLOGICAL SOCIETY.

THE November meeting of this society was held in the Masonic room at the Grand Hotel, Manchester, Mr. William Headridge, president, in the chair.

ALTERATION OF RULES.

Mr. Sims gave notice that, at the next meeting, he should introduce a motion for changing the rules relating to the election of new members. By the present Rules the application of a candidate after being brought before the council was mentioned at the next meeting of the society. He should therefore, move such an alteration in the rules as would allow the balloting for a candidate to take place at the meeting next after that at which he had been nominated.

ELECTION OF NEW MEMBERS.

Mr. W. A. Hooton, L.D.S., Eng., 116, Great Ducie Street, Manchester, and Mr. Charles R. Morley, L.D.S., Eng., 264, Oxford Road, Manchester were then both elected members of the society.

CASUAL COMMUNICATIONS.

Mr. G. N. Skipp, exhibited a lower molar showing pulp of the pulp, also a hypodermic syringe. He also read an article from the *British Medical Journal* detailing a case of death during the administration of nitrous oxide gas.

In reference to the latter matter, Dr. Shaw thought the facts stated need not cause any apprehension in regard to the

use of this agent. He would like to know how many deaths had actually been due to the gas since its first use.

In reply to this inquiry Mr. Planck said that, at the lowest estimate, the gas must be given, in different parts of the world, at least a million times a year; yet there were only four or five cases in which there had been a fatal result; which led him to consider the danger in its administration as hardly worth noticing.

DISCUSSION.

The business of the evening being the adjourned discussion on Mr. Houghton's paper "Notes on Cocaine," which he read during the last session, it was resumed by Mr. Sims who said that as some time had elapsed since the society had discussed the subject, it would be an advantage to them all, in the light of a larger experience, to have the opportunity of restating their opinions, and if possible of arriving at some definite conclusion as to the value of cocaine to the dental surgeon. The subject was one of much importance, as was evidenced by the fact that this was the third evening within two years, that the society had given to its discussion. He supposed cocaine must have been used thousands of times in the extraction of teeth, yet it was remarkable how conflicting was the recorded testimony regarding it and this not only formerly, when there was a doubt as to the purity of the preparations offered to the dentist, but at the present time when he supposed pure hydrochlorate of cocaine to be easily obtainable.

Experience, however, had demonstrated that cocaine was an agent of great potency, and one to be used with the greatest caution. He had noticed that recent writers and speakers almost universally agreed in suggesting half a grain as the usual quantity for injection, while formerly one grain had been recommended. In his own practice he had not exceeded half grain in the cases where latterly he had given cocaine, but that even a small quantity of cocaine was not without occasional ill-effect was proved by the experience of McMansell, as recorded in the *British Journal of Dental Science*, where the injection of a quarter grain had been followed by the complete prostration of the patient, which necessitated his remaining in McMansell's home for two days.

Having determined the maximum quantity that could, as a general rule, safely inject, the question then arose whether they could with this quantity produce such a complete condi-

tion of local anæsthesia, as to be able to painlessly remove the tooth, or teeth, requiring to be extracted. His experience led him to believe that it was only in a small proportion of cases this was possible. Mr. Houghton in his paper gave the number of cases where pain was felt as one in seventeen, but his (Mr. Sims) results were not so favourable. He supposed they were generally agreed that the best preparation of cocaine was the one supplied in tabloids by a firm of London chemists. In regard to the syringe itself, Mr. Sims spoke highly of the one designed by Mr. Houghton, a member of the society, and made by Messrs. Weiss & Co., Manchester and London.

Notwithstanding the satisfactory experience of cocaine, Mr. Sims believed it would still have its place among the agents at the command of dentists. In difficult cases of extraction, where the effects of gas were of too short duration it would probably still be used, especially applied to the cervical margins of the gums, it was of value when teeth had to be ligatured in the application of the rubber dam : and in cases where the sensibility of the soft palate made it difficult to obtain an impression in the mouth, by painting the soft palate with a solution of cocaine, decided benefit was obtained.

It was also of value in diminishing the after pain of extraction, and in these cases was best applied on a pledget of cotton wool moistened with carbolic acid and placed in the cavity of the extracted tooth. Perhaps the future would reveal to them an agent similar to cocaine, but without its objectionable features, or possibly their ideal local anæsthetic would be cocaine associated with some other agent capable of counteracting its sometimes ill effects.

Dr. Shaw asked whether the experiences they were having with cocaine were on the same lines as those when nitrous oxide was first introduced. Of course, there was then a good deal of fear that its use might produce unhappy results, and there were many head shakings and predictions, but his impression was that the nitrous oxide gas did not excite the fears they had heard expressed in regard to cocaine. Be that as it might be, as the gas has outlived inexperience, prejudices and fears, he suggested that it was highly probable that when they became better acquainted with cocaine they should find it much more harmless than it was regarded at present.

Mr. Peter Headridge said that cocaine was, no doubt, very useful in taking away the sensitiveness around teeth when

applying the ligatures for the rubber dam ; and for the extraction of roots when we did not want to use the gas. In some cases his experience had been that it was of very little effect ; and he was rather shaken in the confidence with which he used to be inspired. The first time he used it was upon a medical gentleman who declared it had a wonderful effect, but shortly afterwards he seemed to have changed his opinion. He would hardly like to say that cocaine had excited the same amount of fear as nitrous oxide when it was first introduced ; and he thought there could not be the same danger, as it was only applied to the surface.

Mr. G. G. Campion thought they perhaps felt a little difficulty in discussing the subject at any great length, since they had already contributed much of what they had to say in the previous discussion which had been held. With regard to the use of the alkaloid dissolved in Ether, he had tried it when first suggested by Mr. Boyd Wallis, but as he found in one case that the Ether boiled in the tissues he at once discontinued the practice. From what he had heard and seen he believed there was a very small proportion of cases, probably not more than 1 or 2 in 1000, in which cocaine when applied directly to the carious dentine in a cavity markedly diminished the pain of excavation ; but he agreed that, generally speaking, the advantages of the drug applied in this way were nil. He did not quite understand Mr. Headridge's remark that cocaine was only applied to the surface ; for in cases of extraction it was injected in to the submucous tissue when it got into the blood and so acted more or less on the whole system.

Mr. G. N. Skipp said he had not heard, in this discussion, of any method of diagnosis when the application of cocaine would be successful or not. In injecting cocaine he only made one puncture, for if more than one is made the drug escaped. He thought they could nearly always extract a tooth painlessly when there was an amount of natural movement in it,—he did not mean movement due to inflammation, but thickened periosteum. In sickness from cocaine he found ten grain doses of antipyrine of great value.

Mr. Collett said he had used cocaine extensively for the past few months and had been very pleased with it at first, and had thought it a most useful drug, but latterly he had had one or two very nasty cases. A few days ago he injected a third of a grain when the patient fainted ; and when she

came round she looked livid and complained of feeling very sick. In another case, with the same dose, the lady was affected with violent palpitation of the heart. He did not think cocaine would be a failure in extracting teeth from the upper jaw, unless there was extensive inflammation.

Mr. Pitt said his experience had been much the same as Mr. Collett's. From a discussion at the Odontological Society in London he came to the conclusion that the administration of cocaine was of doubtful utility. He adopted the use of this drug about a year ago and at first with great success. A short time since he had a gentleman from India as a patient and he injected half a grain in order to extract an upper molar. Just after he had extracted the tooth the patient nearly fainted, and was in a state of semi-collapse; and remained ill for some days after. He had also had a lady patient who was affected with twitchings of the limbs and faintness, and who became quite prostrate and remained unwell for a few days.

Mr. Dougan said that, from the very first, he had been opposed to cocaine. When he used to mention bad cases he was laughed at; but he did not think anyone would laugh now. He had used three and a half grains without any ill effects. In regard to what had been said in reference to the mode of using cocaine, more could be taken internally with impunity than could be injected into the tissues.

The President said that, like many others, he rushed into the use of this drug, and was favourably impressed with it, for he thought that if it would relieve pain, it was preferable to placing the patient beyond all susceptibility. Like others, however, he had latterly one or two unfortunate cases which had made him feel rather chary of its use. He found, as a rule, the application of this drug was more successful in people from forty-five to sixty, then in those from twenty to twenty-five years of age. He then called upon Mr. Houghton, the reader of the paper, to close the discussion.

Mr. Houghton said that he thought he had better confine himself to the questions which had been asked at the time he read his paper.

Dr. Shaw had asked the time required for the injection, and how long a time should elapse before operating. He also asked if more than one tooth can be removed after an injection. He would reply that it took about a minute for the injection of the cocaine, and then he operated in about a minute or two afterwards.

In reply to the second question, Mr. Houghton quoted a case from his note book. A gentleman came to have several teeth removed. He injected one grain of cocaine in several places. The operation was a very severe one, owing to the formation of a wisdom tooth, and lasted quite twenty minutes, but was painless with the exception of the wisdom tooth which caused slight pain.

Mr. G. G. Campion had asked whether the drug lost its effects by repeated use ; to which Mr. Houghton replied that this was a very difficult question to answer. He had noticed that when he had to remove a large number of teeth, requiring more than one visit, that in some cases the effect had not been so good in the second and third visits as the first ; but whether that was owing to the cocaine losing its effects, or that the teeth removed on the first visit were in a more favourable position for the use of the cocaine, he could not say. He had had cases where the last injection had been more successful than the first.

Mr. Sims had asked if by sickness was meant actual vomiting : to which Mr. Houghton replied that it was very rare that the feeling of sickness was so severe as to result in actual vomiting, but it had been so in the case of a gentleman who was very stout, of a sanguine temperament, and exceedingly nervous. Half a grain of cocaine was injected ; but, before he could be operated upon, he commenced vomiting violently, and did not stop until he had got rid of a very full stomach. As soon as possible an attempt was made to remove the tooth, but the pain was so great that another half grain of cocaine was injected without much pain. Since then cocaine had been administered to the same patient causing some sickness, but nothing like as in the first instance ; the only after effects being a severe headache lasting some hours.

The proceedings then terminated with a vote of thanks to Mr. Houghton for his admirable paper.

WE have it on good authority that the King of Italy has arranged to establish a dental school in Rome in connection with King's College of Medicine.

STUDENT'S SOCIETY.
DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, Held Oct. 14th, 1889.

W. HERN, Esq., *President* in the chair.

THE minutes of the previous meeting were read and confirmed.

Messrs. Carter-Braue, Gardner and Coysh signed the obligation book and were formally admitted to the membership of the society.

The following gentlemen were balloted for, and elected members of the Society :

Messrs. F. J. Armitage, Balding, A. Barnes, E. J. Blane, A. Bart, C. F. Carter, B. Costello, G. Dalton, R. W. Gracey, W. Harrison, H. G. Humphreys, J. Keckwick, F. Ladmore, E. A. Mansell, W. H. Morgan, W. J. Pike, A. Pearse, W. J. Roberts, F. Rooke A. Spiers, H. P. Spurr, H. Taylor, Waller and C. Watson.

The President moved, according to notice given at the previous meeting, that Rule XXII be so altered that the sentence "the chair to be taken at 7 o'clock p.m., and the meeting to be adjourned at 8.30," may read "the chair to be taken at 8 o'clock, and the meeting to be adjourned at 9.30."

Also that Rule XXIII shall read "that at the meeting preceding the Annual General Meeting the President shall announce the list of officers and councillors proposed by the Council for the ensuing year, and shall ask if any member wishes to propose further names. These names, if seconded shall be printed with those proposed by the Council on the balloting paper, which shall be posted in the Hospital, and sent by post to all honorary members residing in the United Kingdom, together with notice of the Annual General Meeting.

These motions were carried mem. con. on Casual Communications being called for, Mr. Davids showed an old-fashioned automatic mallet and also a lower molar with very curved roots.

Mr. Harrison showed a large upper wisdom tooth with four roots. Mr. Hern made some remarks on the trouble that an extra root may cause. He called to mind a case in which after destroying and filling three roots, the patient had

what he considered pulp-pain. He found a fourth root, the pulp of which was alive, and was the cause of the trouble.

The President gave the history of a case which had occurred in private practice. A little girl had fallen down in the garden and struck her mouth against a stone coping. The left central was knocked right out, and the left canine was hanging by a small piece of periosteum. He replaced the canine, and directed the child to look in the garden for the lost central. This she did and found it next day. This was washed, the nerve cavity filled with gutta percha, and the tooth put back in the socket and retained in place with a wire splint. Mr. Hern saw the patient three months after and the teeth were quite firm.

The President then called on Mr. Briault for his paper on "Dental Education." [see page 1048.]

Mr. W. H. Dolamore, who opened the discussion thought they were very much indebted to Mr. Briault for his paper, more especially as he had been called upon to read it at somewhat short notice, in the absence of Mr. Preedy. He was not inclined to lay the blame of any deficiency in our mechanical training at the door of the mechanical assistant, it depended far more on the pupil, if he was able to do advanced work, it would only too readily be given him, but it must be remembered that his blunders have to be made good by the mechanic, who after all is but working for his salary. He himself had been inclined to grumble at the length of time he was kept backing teeth and turning up bands, but he believed now his fingers were being as well trained so, as they would have been in more advanced work. As in the workroom so in the hospital, each man must depend on himself, lectures are but guides to reading, and in the latter each should trust. He did not believe in special classes for dental students at the General Hospital, it would cause them to be looked on as a body apart from the ordinary medical students, possibly an inferior one.

As regards the expense of taking the full medical curriculum, the speaker said he had yet to find it was the rich who took it, and the poor who did not. Our profession was peculiar in the opportunities it offered to men to earn a living even during their years of study, if they were not afraid of putting on an apron and dirtying their hands. He thought men in practice should be willing to help young fellows in this way, having them in their workroom rather than a

mechanic. On every ground he was altogether in favour of taking a medical qualification. He could not see how they could expect to be looked on as part of the medical profession if they did not. Other specialists, in addition to their ordinary medical work, spend years in learning their speciality. Those who argued against medical diplomas should at least claim no alliance with or part in the medical profession.

Mr. Forsyth could not agree with Mr. Dolamore that it was open to any one who wished to take a medical qualification. He thought that the time and the expense prevented a good many from doing so. With regard to what Mr. Briault had said about students learning to give gas, he would mention that at some hospitals they could take a course of anæsthetic administration by paying a small fee. He thought that the different methods of practice advocated by different surgeons was distinctly to the advantage of the student who thus had the opportunity of forming his own opinion of the best.

Mr. C. Robbins congratulated the Society and Mr. Briault on the practical nature of the paper, especially upon the stress laid on the mechanical portion of our training. It was the foundation of our art. He agreed with a previous speaker, that in the three years a pupil had abundant opportunities of showing what was in him, and of acquiring that finger-training which would stand him in good stead, when he exchanged his tools for instruments, and sitting in front of a bench for standing by the chair side. He did not believe that any man, who was afraid of donning the apron, ever made a good dentist. All should gain experience in taking impressions, if not during his pupilage, then let him take every opportunity of modelling regulation cases at the hospital. But each practitioner should endeavour to give his pupil facilities, and he thought the occasion would arise with those half-pay patients, from which no practice was altogether free.

Mr. Robbins thought the student seeing such various methods of work at the hospital was an advantage, not a disadvantage. Each should select what he thought best. None should confine themselves to one method only, since that which is good in one case may be bad in another. He pointed out how desirable it was for the student, whilst still at the hospital, to adopt a pleasant manner towards his patients. He had known many a man, who was really a genius, fail simply from lack of a little "*nous*." Patients varied and so must the

manner of the practitioner. As regards learning to give nitrous oxide, he did not think it mattered much, which side of the chair the student was, so long as he kept his eyes open. One's time of study does not end with taking the diploma. As years went by he felt more and more the need of learning, more and more that he was still a student.

Mr. Matheson quite agreed with Mr. Briault that there were defects in the present state of the curriculum ; at the same time he would remind him that to remodel a course of study, which, if it did not require an act of Parliament, at least required the large consensus of opinion of such a large body as the General Medical Council, was no light matter. Still, he believed that the time was coming shortly when it would be done. He thought it almost certain that more attention would be paid to the mechanical part of the training, and an examination in mechanics instituted. He would strongly advise all students to have at least three years mechanical training,—he considered four years not at all too much. He would remind his hearers that we must not leave everything to the curriculum. It was individual effort which told, and not so much the outside teaching the student received. In proof of this he would remind his hearers of the names of men who had been famous for dentistry forty or fifty years ago before any curriculum was established. One of the great secrets of success was to treat the patients gently, and not to look on a tooth as a block of stone. Every student ought to bear this in mind, both for his own sake, and that of the patients.

Mr. J. F. Colyer, whilst fully recognizing the value of the paper, was sorry so much space had been devoted to grievances. If, as Mr. Briault stated, it was well to aim high in general education, not being content with examinations of low standards, was it not equally desirable to aim high in professional examinations? All could, if they would, obtain the medical qualifications. He knew men in no better position than other students, who by obtaining some remunerative work for part of the day, had yet succeeded in gaining these. It was essential that all should have a thorough knowledge of Medicine and Surgery, and this, he maintained, the Dental curriculum did not afford. How few Licentiates of Dental Surgery, if called upon to treat some simple wound, say of the leg, would know how to set about it. He had heard remarks which led him to hope, that in the near future an advance would be made in the scope of the L.D.S. exam.,

and he looked forward to the time when the M.R.C.S. would be compulsory. He did not agree with Mr. Robbins, that "it mattered little which side of the chair the student was." Doing things oneself was altogether different from seeing another do them, and he thought each student during the last months of his hospital career, should have the chance of giving gas himself. He believed there were difficulties, but he thought they might be overcome.

Mr. W. Barrett thought it was want of time, and not laziness which prevented men from taking a medical qualification. It was almost impossible to work the two curricula at the same time.

Mr. W. May thought the account of the students' troubles in the workroom, was overdrawn. He might perhaps have been unusually fortunate, but he was always allowed to be present whilst models and bites were being taken. He himself could not see the need of the dentist treating wounds in the leg, indeed he thought such proceeding would be an unwarrantable intrusion.

Mr. Schelling agreed with Mr. Dolamore that it was advisable to take some further diploma than the L.D.S., but thought that it should be in the direction of general education. He would rather have a degree in science or arts than a medical qualification. He thought the former gave more social status. Gentlemen seemed to think that the only title of dentists to be members of society was through the medical profession, that if we are the leaves of the social tree, they were the twigs which hold us on to the tree.

Mr. Hern complimented Mr. Briault on his paper. He quite agreed with what he had said about the importance of preliminary and mechanical training. He thought that special lectures for the Dental Student would be a great mistake as putting a distinction between him and the Medical Student. This was to be avoided if possible. He endorsed what had been said, as to a man having to depend on himself, lectures were only intended to indicate the direction and scope of the students' work. He thought the extra knowledge imparted by the medical curriculum was most useful, though, of course, it was not a guarantee that a man could stop a tooth well. He was very glad to hear what had been said about a coming change in the curriculum, as it was badly needed. He did not think it mattered on which side of the chair the student stood, while gas was being given.

If he were observant he would find no difficulty in giving the gas himself when the time came.

Mr. Briault then replied : He thought any extra qualification should be in the way of general education, rather than in any special direction. He had found considerable difficulty in administering the gas for the first time. He had merely mentioned the differences of opinion expressed by various surgeons, as one cause for perplexity at the commencement of the student's career.

The President then tendered a vote of thanks to Mr. Briault, and to the gentlemen who had brought forward Casual Communications, and announced that next meeting would be held on December 9th, when Mr. D. Cormack would read a paper on "The Treatment of Pulpless Teeth."

The proceedings then terminated.

Dental News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Regulations relating to the Diploma in Dental Surgery.

OLD REGULATIONS.

Education.

Candidates are required to produce the following Certificates.

1. Of registration as a Dental Student by the General Medical Council, 299, Oxford Street, London, W.

2. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of such Registration.

3. Of having attended at a School or Schools recognised by this College, not less than one of each of the following Courses of Lectures, deliver-

NEW REGULATIONS.

Education.

Candidates who registered as Dental Students on or after the 1st January, 1890, are required to produce the following Certificates :

1. Of registration as a Dental Student by the General Medical Council, 299, Oxford Street, London, W.

2. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of such Registration.

- *3. Of having received instruction in Chemistry, including Chemical Physics, Practical Chemistry, and Materia Medica.

ed by Lecturers recognised by this College, namely :—Anatomy, Physiology, Surgery, Medicine, Chemistry and Materia Medica.

4. Of having attended a second Winter Course of Lectures on Anatomy or a Course of not less than twenty Lectures on the Anatomy of the Head and Neck, delivered by Lecturers recognised by this College.

*4. Of having attended, at a recognised Medical School :

- (a) A course of Lectures on Anatomy during not less than six months, or one Winter Session.
- (b) A course of Lectures on Physiology during not less than six months, or one Winter Session.
- (c) A separate practical course of Physiology during not less than three months.
- (d) A course of Lectures on Surgery during not less than six months, or one Winter Session.
- (e) A course of Lectures on Medicine during not less than six months, or one Winter Session.

Students are required to attend Examinations which are held in the several Classes.

5. Of having performed Dissections at a recognised School during not less than nine months.

*5. Of having performed dissections at a recognised School during not less than twelve months.

6. Of having completed a course of Chemical Manipulation, under the superintendence of a teacher or Lec-

6. Of having attended, at a recognised Hospital or Hospitals in the United Kingdom the practice of Surgery

turer recognised by this College.

7. Of having attended, at a recognised Hospital or Hospitals in the United Kingdom, the Practice of Surgery and Clinic Lectures on Surgery during two Winter Sessions.

8. Of having attended, at a recognised School, two courses of Lectures upon each of the following subjects, viz.:—Dental Anatomy and Physiology (Human and comparative) Dental Surgery, Dental Mechanics, and one course of Lectures on Metallurgy, by Lecturers recognised by this College.

9. Of having been engaged during a period of not less than three years in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent practitioner, eighteen months of which instruction may be

and Clinical Lectures on Surgery during two Winter Sessions.

7. Of having attended, at a recognised School, two courses of Lectures upon each of the following subjects, viz.:—Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one course of Lectures on Metallurgy, by Lecturers recognised by this college.

Students are required to attend Examinations which are held in the several Classes.

8. Of having been engaged during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry, under the instruction of a competent practitioner. In the case of qualified Surgeons evidence of not less than two instead of three years of such instruction will be sufficient.

This instruction may be taken prior to the date of registration as a Dental Student.

9. Of having attended at a recognised Dental Hospital, or in the Dental department of a recognised general Hospital, the practice of Dental Surgery during the period of two years.

taken prior to the date of registration as a Dental Student. In the case of qualified Surgeons, evidence of a period of not less than two instead of three years of such instruction will be sufficient.

10. Of having attended at a recognised Dental Hospital, or in the Dental department of a recognised general Hospital the practice of Dental Surgery during a period of two years.

11. Of being twenty-one years of age.

NOTE.—Professional study prior to the date of registration as a Dental Student is not recognised except in the case of instruction in the details of mechanical dentistry; see clause 9.

Examination.

The examination is partly written, partly practical and partly oral.

The written examination comprises General Anatomy and Physiology and General Pathology and Surgery, with especial reference to the practice of the Dental Profession.

At the practical Examination candidates are required to prepare and fill cavities with gold and other material, &c., and required to provide their own instruments.

10. Of being twenty-one years of age.

NOTE.—Professional study prior to the date of registration as a dental student is not recognised except in the case of Chemistry, Practical Chemistry, and Materia Medica, and of instruction in the details of mechanical dentistry; see clauses 3 & 8.

Examination.

The examination is partly written partly practical and partly oral.

*The written examination comprises General Anatomy and Physiology, General Pathology and Surgery, Dental Anatomy and Physiology, and Dental Pathology and Surgery.

*At the practical Examination candidates may be examined.

(a) On the treatment of Dental Caries, and may be required to prepare and fill cavities with

gold or plastic filling or material, or to do any other operation in Dental Surgery. (Candidates must provide their own instruments.)

- (b) On the Mechanical and Surgical treatment of the various irregularities of children's teeth.
- (c) On Mechanical Dentistry.

The oral Examination comprises the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, &c.

Members of the College, in the written examination, will only have to answer those questions set by the Section of the Board consisting of persons skilled in Dental Surgery; and in the oral Examination will be examined only by that Section.

The oral examination comprises the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, &c.

*Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the Examination in Anatomy and Physiology required for the Licence in Surgery of the Royal College of Surgeons in Edinburgh, the Royal College of Surgeons in Ireland or the Faculty of Physicians and Surgeons of Glasgow, or an Examination in Anatomy and Physiology required for a Degree in Medicine or Surgery in the United Kingdom, will be exempt from re-examination in those subjects.

*Candidates, who are Members of the College, or who have passed the Examination in Surgery of the Examining Board in England, or who

shall produce evidence of having passed the Examination in Surgery for the Licence in Surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an Examination in Surgery for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from re-examination in General Surgery and Pathology.

A Candidate whose qualifications shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months unless the Board shall otherwise determine.

Examinations will be held in May and November in each year.

Candidates are required to give fourteen clear days' notice of their intention to present themselves for examination.

The fee for the Diploma is Ten Guineas.

* These Regulations have been altered or re-arranged.

NOTE.—*A ticket of admission to the Museum, to the library, and to the College Lectures will be presented to each Candidate on his obtaining the Diploma.*

EDWARD TRIMMER, *Secretary.*

8th March, 1888.

N.B.—All applications with reference to the Examination for the Diploma in Dental Surgery should be addressed to Mr. F. G. Hallett, Secretary of the Examining Board in England, Examination Hall, Victoria Embankment, London, W.C.

A Candidate whose qualifications shall be found insufficient will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.

Examinations will be held in May and November in each year.

Candidates are required to give fourteen clear days' notice of their intention to present themselves for Examination.

The fee for the Diploma is Ten Guineas.

APPOINTMENT.

At a General meeting of the Governors of the Cumberland Infirmary, Carlisle, held on the 21st, inst., Mr. J. F. Kekwick, L.D.S.I., was elected Honorary Dental Surgeon to that Institution, vice, Mr. Warwick Hele, L.D.S., Eng., resigned.

Hospital Reports.

MONTHLY STATEMENT of operations performed at the Dental Hospital of London, during October, 1889 :—

Extractions	{ Children under 14	477
	{ Adults	982
	{ Under Nitrous Oxide	1063
Gold Fillings		510
Other Fillings		1459
Advice and Irregularities		179
Miscellaneous		533
Total		5203

A. H. SMITH,	} <i>House Surgeons.</i>
A. R. COLYER,	
F. C. PORTER,	

Work done at the Victoria Dental Hospital of Manchester, during the month of October, 1889.

Number of patients attended		1120
Extractions	{ Children under 14	} 805
	{ Adults	
	{ Under Nitrous Oxide	
Gold Stoppings		35
Other Stoppings		93
Miscellaneous		450
Total		1518

CHARLES H. SMALE, *House Surgeon.*

Work done at the Birmingham Dental Hospital, 72, Newhall Street, during the month of October, 1889 :—

Males	123
Females	186
Children under ten years of age	135
Extractions	452
Gold Fillings	10
Other Fillings	75
Advice	87
Anæsthetics administered	21

FRED. R. HOWARD, *House Surgeon.*

STATEMENT of operations performed at the National Dental Hospital, from September 30th to October 31st, 1889 :—

Number of patients attended	1982
Extractions { Children under 14	333
Adults	540
Under Nitrous Oxide	858
Gold Stoppings	96
Other Stoppings	397
Advice and Scaling	487
Irregularities of the Teeth	71
Miscellaneous	156
Total	2938

EDGAR A. H. FIELD, }
 HORACE H. ELLIOT, } *House Surgeons.*
 FRED. A. HUET, }

British Journal of Dental Science.

No. 526. LONDON, DEC. 16th, 1889. VOL. XXXII.

SOME POINTS IN THE ETIOLOGY, DIAGNOSIS AND TREATMENT OF EMPYEMA OF THE ANTRUM.*

BY FELIX SEMON, M.D., F.R.C.P.

It is with considerable diffidence that I have, in response to the flattering invitation of your President to read a paper before the Odontological Society of Great Britain, selected the subject of Empyema of the Antrum. The reasons for this diffidence are not far to seek; in the first place, my personal experience with regard to this disease is very limited; secondly, none of the cases I have observed have shown any unusual symptoms or offered other points worthy of detailed description; thirdly, the views on the whole subject of empyema of the antrum are at this moment in such a state of fluctuation that any opinions about it which may be offered to-day may be antiquated to-morrow.

If, nevertheless, I have ventured to select it, it is just the last-named circumstances which has prompted my choice. The discrepancies of opinion as to etiology, diagnosis and treatment of this important and troublesome affection are so great that I hope it may be acceptable to a society of experts to have laid before them a review of the present state of these questions. I wish particularly to state at the onset of my remarks that they cannot lay any claim to originality; all I aspire to it to draw attention to those points concerning which it would appear most desirable that a greater consensus of opinion should soon be obtained.

Added to this paper will be found a bibliography, in which the more important papers which have been published since the revival of interest in the question three years ago are enumerated; references to mere casual contributions will be found in the *Internationales Centralblatt für Laryngologie, &c.*, from 1886 to the present day.

* A Paper read before the Odontological Society of Great Britain.

Before entering upon a discussion of the etiology of the affection, it may be well to say a few words concerning its frequency. Empyema of the antrum well illustrates the truth of the saying that there is "fashion in disease" as well as in other things. Whilst up to the commencement of 1886 only a few isolated instances of the affection will be found scattered here and there through medical literature, at the present time we not only have a large special literature on the subject, but careful and trustworthy observers, such as B. Fränkel, Moritz Schmidt, Heryng and others do not hesitate to say that the disease is a "frequent" one. Fränkel states that he has operated upon seven cases within three months; Schmidt made the diagnosis of empyema sixteen times within five months; Heryng diagnosed "with certainty" ten cases within six months. The experiences of these and other observers, however, are completely overshadowed by those of Ziem, of Danzig, to whom the revival of the whole question is due, and who states in a second communication, published in April of last year, that he has opened the antrum in not less than 227 cases. As in his first paper, published in April, 1886, he speaks of thirty-six cases only operated by him so far, it follows that he must have seen no less than 191 cases within two years. The only explanation of this astounding number which suggests itself to my mind is that in consequence of his first communication, which has, no doubt, attracted a great deal of attention everywhere, many practitioners must have sent him cases. My own experience so far does not lead me to subscribe to the comparative frequency of the affection. I have no doubt it is more frequent than has been formerly supposed, and I can but re-echo Schmidt's and Heryng's statements in confessing that I have, in former times, probably left more than one case of empyema of the antrum undiagnosed, but I have, ever since having read Ziem's first paper immediately after its publication in 1886, been on the look-out for instances of this kind, and I do not think that I have since allowed such cases to slip by undiagnosed. However, all I can say is that within the last three and a half years, with a material of several thousand cases of throat and nose affections, I have certainly seen not more than a dozen cases of antrum disease in private practice, and in several of these the diagnosis remained doubtful. The future will, no doubt, throw more light upon the question of the apparent frequency of the affection.

Now with regard to etiology.

Theoretically there is, of course, no reason why occasionally the suppurative process should not commence in the antrum itself, and a few cases probably actually originate in this fashion. In the great majority of cases, however, the antrum is but secondarily affected—the pathological process starting either from the nose or from the teeth. The situation and anatomical relations of the antrum lend themselves to both modes of origin. While on the one hand it opens into the middle meatus of the nose through the ostium maxillare, and whilst it is lined by mucous membrane directly continuous with that of the nose, on the other hand, the alveoli of the two bicuspids, of the first molar and often also of the second molar and the canine tooth are separated from the mucous membrane of the antrum only by a very thin layer of bone. These alveoli are usually visible from the antrum in the shape of rounded projections. Sometimes the roots of the teeth actually perforate the bone and are covered by mucous membrane only. In such cases mere extraction of a tooth may open the antrum. (Fränkel).

Under these conditions it is evident that any inflammatory process affecting either the mucous membrane or the bones of the nose, or, on the other hand, the roots or the periosteum of the teeth, or the alveoli themselves, may be propagated into the antrum, and there set up purulent inflammation. Both possibilities are, of course, not denied by any author, but opinions and experiences most markedly and curiously differ as to their actual comparative frequency.

Zuckerkindl, in his classical work on the normal and pathological anatomy of the nasal cavity, says : “ Most by far of the inflammations of the mucous membrane of the maxillary sinus are propagated from the mucous membrane of the nasal cavity. Here it is that the affection first begins and spreads; in its further course it extends to the mucous membrane of Highmore’s antrum. The vascular connection of these cavities is so intimate that the one often reacts in the form of congestion of the mucous membrane, even upon the slightest affection of the other. It is true that the mucous membrane of the maxillary sinus may become inflamed, also from disease of the maxillary bones ; it is equally known that it may become affected through hyperacute affections of the teeth and their alveoli ; B. von Langenbeck even saw purulent blennorrhœa of the maxillary sinus occur in two cases after section

of the infra-orbital nerve, performed after Malgaigne's method, in which the lower wall of the orbita is incised. But this mode of affection of the maxillary sinus is rarer than that propagated from the nasal cavity, and I have, so far, only once had the opportunity of observing it."

In opposing this view Fränkel states his case as follows: "I cannot agree with Zuckerkandl, so far as empyema is concerned. Although I have but small anatomical experience on this point, clinical observation has shown me that in the overwhelming majority of the cases of empyema which I have seen, affections of the alveoli of the teeth have formed the cause of the disease. An instructive example of that mode of production of empyema, which I must consider as characteristic for most of the cases observed by me, is the history of Ziem's own case. This author states that he acquired his own foetid blennorrhœa of the nose by a plug of cotton wool having remained too long in one of his molars, which was carious up to the top of one of its roots. Similar conditions obtain in most cases. The patients, for instance, suffer from chronic alveolar periostitis. As a rule the secretion flows away when formed through the channel of the root. If this, however, should become obstructed by particles of food or anything else, retention of the secretion occurs, as a rule combined with slight quickly-passing pain. The diminution of pain indicates the perforation of the secretion into the maxillary sinus. That such was the mode of origin in my own cases was rendered likely sometimes by the direct observation of the patient, sometimes by the fact that in not a single case of empyema of the antrum I have seen such a tooth had not either been extracted or was still present showing the affection just described."

Fränkel then combats the view that in such cases the order of events might have been just the reverse, *i.e.*, that purulent inflammation of the antrum might have *caused* periostitis and caries of a tooth, and in conclusion of this part of his paper adduces as a further argument in favour of his own view the undeniable fact that of all the accessory cavities of the nose the antrum is by far most frequently the seat of purulent catarrh. This can only be explained by the alveolar origin of the inflammation. Finally he mentions that the nature of the secretion itself speaks against its nasal origin, for in cases of true empyema of the antrum the discharge is always *purulent*,

whilst in the nose itself no purulent secretion is found at the same time.

In spite of these clear, important and, as it appears to me, convincing arguments, the views of authors are still curiously divided on this point, although the experiences of by far the greater number agree with Fränkel's views. Thus Christopher Heath, Lublinski, MacBride, Krieg, Fletcher Ingals, Moritz Schmidt, Schech, Walb, Bayer and Heryng state that in the majority of their own cases the disease evidently started from the teeth.

Schech mentions more specially caries, above all caries of the roots, alveolar periostitis, granular odontitis, formation of fistulæ, deficient dentition, ingrowth of teeth into the maxillary sinus and pushing them into the cavity during clumsy attempts at extraction, amongst the dental causes of purulent catarrh of the antrum, and Walb additionally accuses excessive attempts at conservation of decayed teeth, bad filling and retention of stumps underneath artificial plates.

On the other hand Ziem, Bronner of Bradford and Krause of Berlin lean more towards Zuckerkandl's view, and Friedländer, Krause's assistant, mentions in a recently-published paper that amongst sixteen cases of empyema treated by Hartmann of Berlin there was but one in which the affection was due to affection of the teeth. Bayer of Brussels, although agreeing that the dental and alveolar origin of the disease is the more frequent one, draws special attention to the frequency of the combination of nasal polypi with purulent catarrh of the antrum. In twenty-five cases of the latter affection he found six times nasal polypi, and in at least two of these combination cases the teeth and the alveoli were absolutely healthy. He explains the antrum disease as due in these cases to obstruction of the nasal opening of the sinus by the polypi and to retention of the secretion, a view which is probably correct.

My own experiences are distinctly in favour of the dental origin of the affection; although in several cases the etiology was rather obscure, in the majority the commencement could be clearly traced to affections of the teeth, and I have not seen a single case in which a nasal origin could with certainty be established.

The question wants further elucidation. It is not merely an academic one, but, as will be shown further on, of great practical importance with regard to the best mode of treatment

of the affection. So far, I think, the balance is in favour of those who believe in the greater frequency of the dental origin ; further experience will, no doubt, satisfactorily settle this point.

We next come to the question of diagnosis, and I shall limit my remarks here to the diagnosis of *chronic* empyema, speaking first of those cases in which *no* obstacle exists to the discharge of the purulent secretion of the antrum into the nasal cavity, and secondly, of those cases in which the ostium maxillare (hiatus semilunaris) is *obstructed*.

To Ziem, undoubtedly, is due the merit of having shown, on the one hand, that certain symptoms, which had been handed down from generation to generation as characteristic of empyema of the antrum, are by no means necessarily connected with that disease, and of having on the other hand drawn attention to the importance of other, formerly much neglected, in reality, however, almost pathognomonic signs.

Amongst the former are (1) distension of the sinus, (2) increased secretion when lying on the healthy side, (3) pain in the infra-orbital region, (4) inflammatory swelling of the corresponding cheek. It is, of course, not denied by Ziem that all these symptoms may and do occur, singly or conjointly, in empyema of the antrum, but by the description of his first series of cases he has incontrovertibly shown that well developed empyema often exists without any of these symptoms being present.

The symptoms, on the other hand, to which little attention had formerly been paid, and the importance of which has been emphasised by Ziem, are the *onesidedness* and the *periodicity* of the purulent discharge. The former of these symptoms will, of course, not obtain in cases in which *both* maxillary sinuses are affected, but such cases are according to universal experience exceedingly rare, and do hardly count in comparison to the frequency of the unilateral affection. In a few cases, again, the discharge is continuous, but this also is only an exception to the rule. In the great majority of cases in which the nasal opening of the antrum is not obstructed, the disease is characterised by unilateral, periodical discharge from one nostril, the nostril being, of course, that corresponding to the diseased antrum, and the periodicity corresponding to the different positions of the patient's head. As the ostium maxillare is situated comparatively high above the floor of the antrum, it is obvious that

secretion can only take place when the cavity is either almost full, or when the patient's head is being held in such positions that its emptying into the middle meatus is facilitated. In consequence of these anatomical conditions the patient's statements often are very characteristic. Frequently the complaint is heard that whilst at night, *i.e.*, when the patient lies in recumbent position, and the purulent matter thus, of course, gravitates downwards, there was an almost constant trickling of foul secretion into the *throat*; on the other hand, in the morning, as soon as the patient bent his head slightly forward, as in writing, pus either trickled or streamed in a current from one *nostril*.

A further characteristic circumstance is the fact, that the secretion is almost always fœtid, and the fœtor is perceptible to the patient himself, and that it is, indeed, perceived by him much sooner than by other people.

Quite different from cases of ozæna, the physician, when examining the patient's nose and when compelled to be quite near him, often in cases of empyema perceives hardly anything of the terrible odour, which not rarely forms the patient's most prominent complaint. That the latter, however, is not imaginary, is proven, when in such a case the antrum is opened and often horribly stinking pus is evacuated. Not rarely a putrid taste in the mouth, with nausea and want of appetite, are complained of, but this is not constant.

Equally inconsistent are neuralgic sensations of very varying character. The most frequent of these is a dull heavy pain which, curiously enough, is not nearly so often felt over the diseased part itself as in the region of the frontal sinuses. The true significance of this form of headache, therefore, would appear to be an important diagnostic matter, else the frontal sinus may be opened, whilst the disease is actually in the antrum.

Sometimes there is transitory swelling of the cheek over the affected part; Mac Bride has in two cases seen distinct swelling of the gums.

Not often pain at the bridge or root of the nose, in the cheek, in the ears, in the teeth, is complained of; more frequently, however, depression, inability and disinclination for mental work, hypochondria, general derangement of health, &c. In some cases it is remarkable how much the patient's general health and spirits appear to have suffered from what may be thought so trivial an affection.

Summarising the subjective symptoms of this class of cases, viz., in which free discharge of the secretion can take place, it may be stated that if an adult patient complains of unilateral, periodical, purulent, foetid discharge from one nostril, sometimes combined with various forms of neuralgic headache, nausea, depression of spirits and general derangement of health, the practitioner should always think of disease of the accessory cavities of the nose, in the first place of the antrum.

(To be concluded.)

BETWEEN TWO EVILS.

BY DR. F. W. Low, Buffalo, U.S.A.

Mr. President and Gentlemen :—

“Of harmes two the less is for to choose.”

CHAUCER.

Since texts at best are apt to prove misleading, perhaps it were as well that I should tell you frankly the purpose of this discourse before beginning it.

It is to formulate for your discussion a simple little problem in the science of Catoptrics, the very simplicity of which perhaps must in the main account for its not having generally received the amount of consideration due to it, inasmuch as the important question of appearances hinges upon it in no small degree, whenever our operations involve the approximal surfaces of the oral teeth.

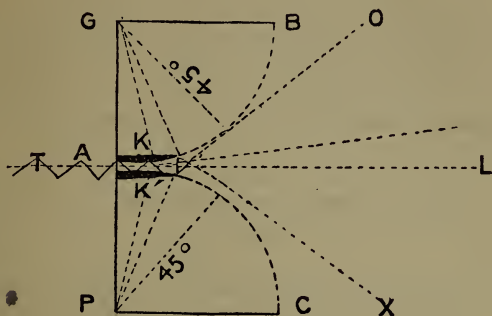
So much by way of preface. The problem itself now follows.

Given a tooth blemished with approximal decay, the outlines of the cavity from its labial aspects just barely showing. Required Gold filling.

Question :—Shall the anterior curve of such a cavity be chiselled out sufficiently to allow this portion of the finished plug to come to the light to show? And if so to what degree?

To the first interrogative your essayist is disposed to answer *Yes*, emphatically. Dogmatic assertion, however, is not always accepted as the most convincing proof, so we shall attempt to fortify, if possible, with approximate mathematical deductions the position we have chosen to assume. For the

sake of simplifying the illustration, we will suppose the interspace between two teeth to be represented by one at least of striking similarity—the space between the arcs of two adjacent circles.



If a direct ray of light (L.T.) is projected, between these arcs into the space (A) at right angles to (G.A.P.) it will strike neither upon (K) or (K') which letters are intended to represent adjoining approximal gold fillings, but will pass between them and be lost in the darkness of the oral cavity.

If a ray of light slightly at variance to a right angle, with (G. A. P.) be projected into the same space, what will be the result? It will strike the gold filling (K or K') but at such an obtuse angle that as before it must eventually pass between the teeth and be lost in darkness as the direct ray was. The fillings (K and K) themselves must take on approximately the degree of light present at the destination of the reflected ray.

This law of reflection is nicely illustrated with these two little mirrors. Observe how inky black some portion of their surfaces appear. It is because the rays of light projected upon them are mostly reflected upon a sombre background. If a ray of light considerably at variance to a right-angle with (G. A. P.) be projected into the same space, what will be the result. Let the lines (OX.) represent such a ray, and we shall see that it does not penetrate deeply enough into the interspace to light the fillings (K or K') at all. The angle of incidence and the angle of reflection being always identically the same, if the ray is projected from the point (O) it will be reflected at (X). If projected at (X) it will be reflected at (O). The direction in which it crosses from tooth to tooth

being determined by the tangents of the radii of their approximal arc centres.

These three examples, it is contended, cover the whole ground. Multiply as you will the variations of angles at which these rays of light are projected into the space, you are sure to be confronted with one of the results before referred to. The several interspaces between the oral teeth draped as they are by the overhanging lip admit few other than direct rays of light, and what becomes of them we have already demonstrated.

Since it is proven then that the mountain will not go to Mahomet, nothing remains for us but to bring Mahomet to the mountain. In other words our approximal gold fillings, to the light.

I know that there are sentimentalists who deem it a desecration and a crime to sacrifice the least iota of normal tooth structure anywhere. They fill approximal cavities in bicuspid teeth where possibly such Vandals as either you or I would reconstruct converting such a cavity into a compound crown approximal. To the sentimentalist my answer is that he who for dear conscience's sake has failed to chisel freely, is he who finds in after years his "house built on the sand." "That the whole is no stronger than its weakest part." This axiom is moreover as applicable to a h-o-l-e, as to the w-h-o-l-e, provided we are speaking of a cavity of decay.

But is it such a blemish after all? Just a mere glint of gold between the two teeth. The æsthetic criticism that it is pandering to a vulgar taste, thus ostentatiously to display appearances of opulence is fairly met by the rejoinder of the poor but the proud and homely Irish girl, who said "the Lord was mighty stingy with his good looks when I was born into this ugly world. The only dower He gave me worth speaking of was me dacent looking, even set of teeth. But for them two little cavities which look for all the world as much like rotten spots as if ye's hadn't filled them, I might have had a little bit of comfort a thinking I had that dacent feature. This characteristic argument together with 8.00 dols. for his fee proved, as might have been expected, an all-sufficient lever to move the obdurate and hyperæsthetic censor. Those teeth have been refilled. Would you have done differently, being thus importuned? Even granting as really was the case, that neither of the fillings were in any defective except as to the matter as above complained of.

The state of mind our Celtic friend, Miss 'Tyranny, must have been labouring under for nearly, or quite, two years, is but a prototype. Our patients have a right to expect of us as artists something more than mere conservation, surely. Is not the slight sacrifice of the enamel wall more than compensated for by the improved appearances? Without it, we had at best but substituted leaden shadows for that which was but little more unsightly, and all too frequently (what though it be an optical delusion)—the same old cavity of decay untouched, as black and grimy as reality itself, still stares us in the face.

To determine to what degree approximal gold fillings shall be brought into the light again involves the question of a choice between two evils.

A patch of gold between the teeth to the eye of the majority seems least a blemish when fully lighted, but to bring a filling forward to that degree entails the destruction of much sound enamel, and as you see being unnecessary, should be avoided. The illumination at an angle of 45 degrees being almost if not quite as brilliant. The reason for this is that the filling at this angle will receive a more copious shower of reflected light rays from the side of its next door neighbour than can possibly be borrowed from any other decree of indirect illumination. That this is true is susceptible of demonstration first, by rotation when you observe that at all points between a full and half light upon the surface of our patch of gold there seems to rest a shadow; second, by substitution of black instead of white, thereby depriving it of all reflected light.

In conclusion, let me offer for your inspection this little card of specimens. The only tooth I care to call particular attention to is the right lateral. This is filled upon the principles laid down in this essay as correct. Holding the card so that you cannot see the filling in this tooth, and then slowly turning it so that the filling is brought into view, you will observe that the first thing noticeable is a mere glimmer or spot of illumination, and this, as the card continues to be rotated travels over the anterior border of the filling, dispelling all shadows until the gold itself is brought into full view.

If the appearance of this filling as compared to the others that are brought more, or less, into the light is not a convincing argument that at the angle of forty-five degrees is the best boundary line to draw the anterior curves of such gold

fillings we cannot be concealed from view entirely, my labour of love for you has indeed been in vain. To recognize this trap as a human oral cavity, however much divested of its drapery of nature, and these as oral teeth, requires perhaps a stretch of the imagination, quite equal to the stretching our patients sometimes complain of when our manipulation embraces the territory, as they are prone to put it from ear to ear ; and I should feel constrained to make apology for it, not only but for the rudimentary nature of this discourse also did I not feel so sure that elementary even as it has proven to be this is after all the treatment of the subject most germane to our needs.

IMPLANTATION OF TEETH.*

By G. CUNNINGHAM, M.A., Cantab., L.D.S., D.M.D., Harv.

Before describing my more recent cases it will be better to follow up the subsequent history of the eight cases already presented to this Association. [see page 5, &c.]

CASE I.—Enquiries have elicited no response.

CASE II.—On the 25th March, 1889, the scion tooth implanted on the 29th Nov., 1887, that is after an interval of one year and four months, was found to be extremely loose, freely movable in anterior and posterior directions, but strongly resistant to downward traction. The patient reported that the tooth gave way with slight crepitation, and was pushed outwards by biting a “hard bread crust.” This accident can only have hastened matters somewhat, as a fortnight previously he had noticed a fistulous opening on the gum. which, as he rightly remarked, was a sign that all was not going on quite right. On extraction the root was found to be considerably absorbed, while it seemed evident that for some time at least it had only been retained by the growth of the granulation tissue into the cavity of absorption. The former socket seemed to be filled up with a formation of new bone above the absorbed root ; the lower border of the gum was red and somewhat inflamed. A dressing of cotton wool saturated with

* A portion of a paper read before the British Dental Association at the Annual General Meeting, 1889.

carbolyzed resin was inserted into the wound, as it was determined to try a second implantation. It was extremely difficult to find a suitable scion tooth for this case, so much so, that the first attempt was made with a rather badly decayed right lower canine, which, after pulp treatment and filling the crown with a porcelain inlay, was ground down to represent the shape of a lateral. After being placed in position it was so unsatisfactory that a honeycombed or pitted, but otherwise healthy lateral was substituted for it. The preparation of the second socket proved more difficult and tedious than the first. A 50 per cent. solution of cocaine hydrochlorate failed to diminish the pain of the operation to any appreciable extent. The tooth was fixed with a gold splint, only covering the tips of the teeth anteriorly, by means of a phosphate cement. During the night the splint came off, and when the patient presented himself next day the tooth was found to be quite loose. Having overcome the patient's objection to a splint which would show from the front, I proceeded to arrange a metal ribbon splint; while doing so the patient flinched and the tooth was left in my hands. I did not regret this so much, as even this second tooth was not satisfactory from the point of view of appearance, and I was obliged to resort to another which I noted at the time as "an emergency case." It was the left upper lateral incisor of a little boy of thirteen years of age, extracted nearly six months previously, and had been kept for 171 days in a one in two thousand solution of mercuric chloride. The pericementum was shreddy and detached, and on the distal surface presented a curious metallic-looking stain. The crown was largely disked in order to adapt it to its position on the right side. The socket was syringed with one in a thousand solution of mercuric chloride. The tooth fitted fairly tightly and was fixed by a German silver ribbon splint extending round the neighbouring adjoining teeth. The pulp, which was non-putrid, was removed when the tooth was *in situ*, the root canal and cavity on the palatal surface being filled in the usual way.

On the 12th August, 1889, this second implantation was found to be not as rigid as the first, but still fairly firm and perfectly comfortable.

Case III.—This case will be familiar as the one which was presented at Dublin last year. Soon after the meeting he had a severe attack of what was described as rheumatic fever. He was delirious for three weeks, and had other complications,

which laid him up for a very considerable time ; it fact, it was quite six months before he could be called fairly convalescent. The patient again kindly presents himself for examination. You will have no hesitation in endorsing the patient's statement, that the scion tooth is "perfectly firm and unshaken, and the gum quite healthy.

Case IV.—On August 9th, 1889, the patient writes to say that the tooth implanted on the 4th February, 1888, is going on very satisfactorily.

Case V.—will be remembered as that of J.H. G., a barrister, in whose case the antrum was perforated in the preparation of the artificial socket. The scion tooth, after becoming absolutely firm and rigid, somewhat suddenly became loose, and was lost just about a year subsequent to the implantation, which more than justified Mr. Baldwin's pessimistic view of the situation. With regard to the fistulous tract in the molar region, which I thought was rather ascribable to the death of the pulp in one of the molars, although no sufficiently carious cavity was apparent, it seems rather to have been caused by the latter condition, since he has been compelled to drill into the molar and remove the dead pulp.

Case VI.—T.S.G. Enquiries have been elicited no response.

Case VII.—The patient writes, August 15th, 1887 : "Tooth very firm."

Case VIII. was remarkable in my report of last year from my having noted it as being probably a failure. The patient, from the urgency of his duties in a large and important public school, was unable to present himself for examination until the Christmas vacation. On January 2nd, 1889, the patient reported that he had worn the splint for about six weeks, or possibly longer, after the operation, but on removal he found that the tooth was quite loose. He had had, however, absolutely no pain or trouble with it. The tooth was found to be extremely loose ; the labial surface of the gum over it and the adjoining teeth were in a chronic state of inflammation ; on the palatal surface the tissues were so absorbed as to expose a portion of the root of the scion tooth, but the gum seemed quite healthy in appearance. This surface was quite clean, while the labial surface was covered with food debris, the patient being afraid to brush it in consequence of its looseness. The tooth could be moved up and down in the socket, but was so retained that it could not be

pulled out with the fingers, showing that there was a distinct attachment of some sort. The lateral movement was very considerable, and by holding the crown one seemed to be able to move the apex of the tooth very slightly. The gum was detached for some way all round the root, but no signs of pus formation were observable. The articulation was such that on each closure of the mouth the tooth made a considerable excursion upwards and forwards. My own inclination was to remove the tooth at once, but the patient preferred giving it a longer trial ; the articulation was therefore eased, and a new gold splint applied. The inflamed gum was treated with resortion and tincture of iodine. In the course of the third week the splint, from the thinness of the rings, broke, and on his presenting himself in the Easter vacation the patient accepted my decision as final, and the tooth was removed.

Although it is not certain that direct reunion of the pulp has occurred in these cases, but only an ingrowth of new granulation tissue, such evidence alone seems to justify my endeavour to ascertain whether it was absolutely essential to eradicate the pulp of the scion tooth in the analogous case of implanted teeth. Although in such cases my fear was that it would be futile, I deemed it better to establish the fact by actual experiment. I, therefore, determined to adopt it should a favourable opportunity occur, always recognising that the shorter the interval between extraction and implantation the better would be the prospect of union. Another motive which impelled me to attempt what some may deem an utterly hopeless experiment was the fact that thereby one would remove what is an undoubted disadvantage, viz., the injury more or less great which must ensue to the periosteum when the tooth is prepared and filled out of the mouth, while, moreover, I thought that by carefully watching such teeth one might be able to mark the degeneration of the pulp from external experiences, and, by its then removal, prevent the deleterious consequences that might be anticipated therefrom extending to the area beyond the apex.

With these views, and under the stress of exceptional circumstances, I endeavoured to determine this point in the following case.

CASE IX. will be familiar to some of you, since it formed the subject of my clinic on this operation at the Dublin meeting. The patient, R. E. T., was a healthy young dentist, aged twenty-four, who had lost the right upper first bicuspid

some years previously. The gum was healthy, absorption of the alveolus complete, and the condition of the operating field seemed entirely favourable. The scion tooth (a left upper first bicuspid) was extracted from the mouth of a healthy young girl aged sixteen, and was out of the mouth only about three-quarters of an hour, during which time it was kept in one-thousandth solution of mercuric chloride. Owing to the circumstances, I neglected to make my usual notes on the condition of the periosteum, but my impression is that while the root seemed only partially covered with periosteum it was not, as far as my experience went, at all an unfavourable case for implantation. In adjusting a metal ribbon splint of the usual kind with phosphate cement, I found to my dismay that the latter did not seem to set properly. It was a fresh packet of Weston's cement furnished direct from one of the exhibitors, and I therefore thought it might only be extremely slow setting and that it was better to let the partially set mass remain, thinking that all it wanted was time to complete the process. The cement, however, never thoroughly set, and within two days the splint came away.

I have been unable to get the exact details of the subsequent history of this case, but the gist of it is as follows :—The case was more or less troublesome from the first. The tooth was never firm. In October my brother removed the pulp, and filled the root canal. In December the patient removed the tooth himself. The roots were much absorbed.

CASE X. was that of a young Cambridge graduate, A. T., aged twenty-three, of excellent physique and extraordinary good health, despite the fact that his teeth and gums were in a simply deplorable condition, but after an extensive series of conservative operations upon other teeth it was found that four of those in the upper jaw were so bad as to necessitate radical treatment in the shape of extraction. There were two fistulous openings, one over the right upper lateral incisor and the other over the left upper bicuspid, while of both the first molars only the remnants of the three separate roots remained. The aspect of the gums were of dull purple colour, with swollen inter-dental papillæ, in fact, that chronic gingivitis which is a characteristic of a long-neglected mouth. The case was certainly not a favourable one, but it was determined to make the experiment of implantation there and then, because the operations would be less severe if performed at that time than if they were postponed until the parts had com-

pletely healed. On August 30th the remains of these four teeth were removed. On September 1st the sockets of the right upper lateral and the left upper bicuspid were enlarged and widened in their own extent. The scion tooth for the incisor space was the right upper lateral incisor of a healthy young woman, aged nineteen. The pulp was removed and the root canal filled with zinc oxychloride, and the two carious cavities in the crown filled with gold. With regard to the condition of the periosteum the upper part was very bare and the entire root very much stripped. Every care, however, was taken with these remnants of the periosteum by retaining the scion tooth during the treatment in the holder which I described last year. The interval of time which elapsed between its being extracted and implanted was exactly twenty-five hours, during which time it was retained in the usual solution of mercuric chloride, 1 in 2000. It was secured in position by means of a metal ribbon splint and phosphate cement.

The scion tooth for the bicuspid space was taken from a healthy young patient, aged thirteen, and was prepared in the same way with the same care as the other tooth, but owing to the apices of the root being still patent the instrument and the filling material passed through the foramina. There was much more periosteum on this tooth than the other, but only in patches, while the greater part of both the labial and distal surfaces were completely stripped. In this case four days elapsed between extraction and implantation of the scion tooth, during which time it was kept in the usual solution. On completion of the operation it fitted so firmly between its two neighbours that no splint or ligature was deemed necessary. An idea of the satisfactory condition of the operating field in this case may be gathered from the fact that on the same day I was obliged to make a series of small scissor incisions in flaps of the gum with a view of inducing it to grow over the alveolar border which was completely exposed in several instances in the inter-dental spaces. On September 3rd the sockets of the molars were prepared for the scion teeth. These both came from a healthy young girl, aged fifteen, and as the time between extraction and implantation was of the very briefest and the teeth for all practical purposes sound and perfect, the pulps were not removed. The periosteum, however, seemed to be almost entirely stripped off in the process of extraction, with the exception of a fair

investment at the apices of the roots. The interval between extraction and implantation was twelve minutes in the case of the left molar and twenty minutes in the case of the right. Both teeth fitted so tightly that no splints were applied. The patient left Cambridge two days afterwards, and reported that the case seemed to be going on fairly well. About September 13th the teeth became somewhat displaced and the patient wrote asking for a splint to be sent. I was then away on my holiday and the assistant sent him a splint with instructions for its application. On September 15th the patient wrote :—" I tried to follow your instructions but only succeeded in making the teeth much looser, therefore went to a Bradford dentist and let him try—same result, that is, teeth much looser still, in fact, I thought myself more successful than he. . . . That they stood all this pulling about makes me believe they would have held if I had left them alone, but now they are so very loose that it hardly seems safe to leave them unfastened."

On his return to Cambridge on the 16th the teeth were found to be loose, those on the left side particularly so, and pressure of the gum on the labial surface caused a considerable amount of pus to flow from both molars ; similar pressure on the palatal surface betrayed no existence of pus formation. The wire splints having been re-shaped they were applied, and the teeth fastened with thin wire. The mouth had not been kept so clean as it might have been, and extra urgent advice was given him on that point. Towards the beginning of November the thin binding wire seems to have led to considerable swelling of the gums, which promptly yielded to an arnica and chlorate of potash wash.

On November 18th the patient writes that " Either the bone or the root of the molar on the left side appears through a small hole in the gum so that I can touch it." It was not, however, until January 11th that he was able to return to Cambridge, the dental alloy splint being still in position. I noted the condition of the parts four months after the operation as follows : the right upper lateral incisor and first molar fairly firm in splint, left upper bicuspid and molar loose and evidently doomed ; much food debris and other deposits on the left side, the right side in better condition. On removal of the splint the lateral seemed fairly firm, the right molar less so. The gum was noted as being in fairly healthy condition for a normally purple gum ; the left upper bicuspid

was quite loose and the gum deeply congested. The tooth could be made to make a considerable excursion both in labial and palatal directions, but on traction with the fingers would not come out. It rose and descended in the socket as the patient opened and closed his jaw. The molar was even in a worse condition, the buccal roots were quite exposed and the gum and the alveolar plate seemed quite gone, the surface being thick with putrifactive débris. The excursion of the tooth laterally seemed quite unlimited ; there was, however, resistance to downward traction. This, however, seemed entirely due to attachment on the palatal root which however was only apical. The molar was then removed with the fingers ; it looked and smelt like what it was—viz., a badly necrosed tooth, with a merest attachment at the end of the palatal root. It was decided to give the right molar every chance, and although not very promising the crown was drilled into, the pulp removed, the root and crown being treated in the usual way. From the pus, however, which exuded from the border of the gum it was evident that it was following very much the same course as its fellow on the other side.

On April 29th, about seven months after the operation, I had another opportunity of examining the case, when the general condition of the mouth was noted as badly inflamed, but bright raw patches on the labial surface of the gum. The right upper lateral incisor was loose and could be made to make a considerable excursion forward, when it was evident that there was no attachment of the gum on the palatal surface, though the gum there was pink and healthy. There was no dropping of the tooth, nor could it be forced upwards, indicating considerable attachment ; labially there was a fistulous opening with a discharge of pus. On examination I could find no signs of bone on the labial surface of the root, only a thin covering of the gum with considerable absorption in the neighbourhood of the fistula. Both the central incisors, which were pulpless, had also been treated in August, 1888, were also rather loose, and on enquiry I found there was a history of rather a severe blow at football which occurred in February, 1889. The left upper molar showed considerable freedom of movement in labial and palatal direction on pressure, while pus was escaping from the labial margin of the gum. I noted at the time that it seemed as though the absorption of the alveolar border which usually occurs after extraction had gone

on in spite of the implantation. The gums had receded and were for him of a fairly healthy colour ; the roots of the implanted teeth were largely exposed and looked as if necrosed. The left upper bicuspid was in a hopeless condition, moving freely in all directions ; it was therefore removed. An effort was made to improve the conditions of the two teeth on the right side, but unsuccessfully, for on the patient again presenting himself on August 7th, 1889, the molar was found to be in a hopeless condition with pus exuding from the margin of the gum, it was therefore extracted and found to be quite necrosed. The lateral incisor was loose, but without the slightest sign of any pus formation ; there was great absorption on the labial and lingual aspects, the gum even to the very edge seemed what we would call normal for this mouth. It was quite resistant to downward traction, and required some considerable force to extract it. The parts rapidly healed and two partial bridges, the of them removable, have been adjusted to fill up the space.

To be concluded.

TO PREVENT CATCHING THE RUBBER DAM.—In a contemporary it is suggested running the edge of sandpaper or corundum disc over a cake of dry toilet soap, giving a smooth edge which will glide over the rubber dam, preventing the catching which is so annoying.

A FUSIBLE METAL.—The following is a formula for a fusible metal, for which we are indebted to the *Western Dental Journal* :

Bismuth.....	8 oz.
Tin.....	2 oz.
Lead	4 oz.
Cadminum.....	2 oz.

16 oz.

Fusing point 160 deg. Fahr.

British Journal of Dental Science

LONDON, DECEMBER 16th, 1889.

EDUCATION VERSUS QUACKERY.

SPEAKING at the recent dinner of the past and present students of the Dental Hospital of London, Mr. Morton Smale, the Dean of the Faculty, and member of the Dental Examining Board of the Royal College of Surgeons of England, declared his conviction that with the higher standard of education, which is gradually permeating the profession, the *nunc dimittis* of quackery and chicanery will be sung. The outlook has certainly been dark enough, and good men and true have sometimes felt that in spite of their efforts the quacks were in the ascendant; not the old quack, but a brand new creature, resplendent with bogus D.D.S., and bolstered by high sounding terms for his little dentist's shop, but still a humbug and charlatan. It is then with a sigh of relief that we learn "things are not what they seem," that the halcyon epoch of dentistry is at hand, Dame Justitia is at length about to balance in her scales solid education against pretence and blather, and that solidity will tell and rascality kick the beam in the wrong direction. The reasons for Mr. Smale's optimistic vaticinations may well detain us for awhile. Dentistry as a profession we may almost say had no objective existence before the passing of the Dentists' Act, for although there were in London and the larger provincial towns, men who knew and taught dentistry in the lines we now are accustomed to see it run in, yet outside their personal repute, or their professional standing as members of the Royal College of Surgeons, they possessed no status. With the stir which culminated in the Dentists' Act,

the Odontological Society, and the British Dental Association came the irruption of non-dental suttlers and camp followers who forced themselves, and their apprentices upon the register. The natural history of such beings must necessarily be a descent, fortunately it is not true of them "*Facilis descensus Averni*," a descent from bad to worse, from miserable failure as an honest dentist, since of dentistry the most of them knew nothing, to a still more wretched failure as cheap-jack dental puffers in local papers. Kindly Nature is removing these gently by the simple process of dying out, and in their stead we have the modern advertising dentist, and the modern charlatan and humbug. Either as a covered man, or an outlaw, the modern dental footpad preys upon the public, but, fortunately, the public are daily becoming more keenly alive to what good dentistry means, and only its less educated and more sleepy members are lured by the grinning case of teeth and luring announcement of "Painless Dentistry at Popular Prices." The more dangerous members of the puffing confraternity are the qualified men, the L.D.S.'s and gentry who, failing to earn their bread in America by legal means, are either cajoled over, or come over here at their own sweet will to teach the natives the soft and gentle craft which they called by the euphemism of "American Dentistry." Dentistry is, as Mr. Smale well puts it, cosmopolitan, the servant of the suffering nations, and no more American than was surgery French when old Ambroise Paré rose head and shoulders above his compeers, or astronomy Italian for the sake of Galileo. That L.D.S.'s should advertise and cover is not surprising, because up to a year or so ago *sine curriculo* men swarmed into the profession, and clause 37 is now being used as a backstairs for the weak-knee'd and inept, while the standard of work required has allowed some very feeble persons to slip through the portals of examination and blossom in the full effulgence of the L.D.S. We agree with what seemed to be the spirit of Mr. Smale's address that prosecution is but an uncertain lever wherewith to shake to its fall the dark blot on our profession, the advertising

and unscrupulous dentist, while increased severity of examination and prolongation of the curriculum, even if you will making the triple qualification compulsory, will do far more to prevent unprofessional behaviour and check charlatanism. The cultured dentist, who engrafts a sound professional knowledge coupled with a deft mechanical hand upon the stock of a thorough general education must in the end survive the cheapjack and the impostor, and though there will inevitably be different grades of dentists for different grades of people, there cannot but be, as the effects of recent enactments begin to tell, a general step upwards in the profession, while its common ethical standard will necessarily undergo a corresponding improvement.

PRACTICAL HINTS.—The following useful suggestions are due to the *International Dental Journal*.—To prevent the splitting and breaking of pulpless teeth.—Dr. Morgan Howe says that grinding off the under cusps will save the splits. It is necessary to remove only $\frac{1}{4}$ or less of the tooth structure which would be otherwise lost by the split. The same authority regards the term "Retaining pits" as a misnomer. Few if any fillings can be retained by pits, it is the general shape of the cavity which will retain the filling or not. The drill holes made in the dentine and called "retaining pits" can at best only retain the part of the filling anchored in them, while more is added in the process of construction; and for this purpose, even when a cavity is well prepared, they may be reduced to a minimum. One shallow pit in one corner will almost always serve the purpose, and even this may be frequently dispensed with. The practice of drilling pits in the bottom or sides of cavities, to start or retain fillings, is undoubtedly responsible for the death of many pulps. The latter do not tolerate the near approach of a conducting material, when that proximity is suddenly thrust upon them in drilling into sound dentine, for instance, in nearly so great a degree as when the approach of irritating agents has been more gradual, as in the slower advance of decay. Yet

in the latter case it is a common and wise practice to interpose some non-irritating, non-conducting medium, where cavities are deep ; but if it so happens that there appears to be a difficulty in starting or making a filling, it is not uncommon, it appears, to not only dispense with the non-conducting medium under the filling, but in addition to immensely increase the danger to the pulp by drilling one or more holes into the sound dentine, into which one of the best of conductors is packed. Fortunately, the increasing use and appreciation of non-cohesive gold is making the dangerous and seductive retaining pit less important in the process of constructing gold fillings.

Mr. J. BOND LITTER writes :—As the saving of time is an object to most dentists, I will describe a process of soldering small pieces of gold work, which, though not new to all, may be of service to many. If you have a plate with two or three teeth which you wish to attach by means of solder, back the teeth and fasten in position by means of hard wax ; then take moulding-sand and wet it thoroughly, until it is of the consistency of soft putty ; place this on your soldering block, press the plate into it, and bring the sand well up around the teeth. Now take your blow-pipe and throw a broad, gentle flame around the outer edges of the sand, taking care not to let the flame touch the plate or teeth until the water is driven off and the wax begins to blaze ; then direct the flame upon the wax and burn it off. Scrape well the parts upon which you wish the solder to flow ; then place on the solder and borax, and proceed as usual. Partly fill a saucepan with water, and place it over a gas or oil-stove, and when it boils hold the case, wrapped (investment and all) in a cloth, over the steam for half a minute close to the water ; then drop it in, remove and take out the piece. Clasps and small regulating pieces are held together and soldered by this process very quickly. I have yet to crack my first tooth by soldering in this manner, which, I think, is due to the fact that the expansion by steam heat is more uniform than by dry. Sand which has been used for moulding purposes is dangerous to

use, as particles of zinc or lead may be present, and thus become alloyed with the gold.

AN ITEM IN THE HISTORY OF NITROUS OXIDE GAS.—A correspondent, Mr. C. A. Mills, writing to the *Dental Cosmos* says—The truth is that Dr. Riggs, under oath filed in the records of the Historical Society of Hartford, said in substance that Dr. Wells with his own hands administered the gas furnished by Dr. Colton, who at the time of the operation was standing in the door-way of the office. Furthermore, it was the *tooth* instead of “the teeth” that Dr. Riggs extracted. The preceding information was given to me by Dr. Riggs during my last conversation with him in the autumn previous to his demise, and is of consequence as related to the facts in the history of the discovery of anæsthesia.

THE OIL OF PEPPERMINT IN ROOT-DRESSING.—Dr. Register in *International Dental Journal* says.—Copper amalgam, into which is rubbed a small quantity of the following dressing, has, in my hands, given me the most satisfaction.

R. Oil Peppermint.....3j

Iodoform	} aa 3ss
Glycerine Starch	

The dressing is easily carried upon a broach. The vegetable starchy matter, being in such small quantity, does not decompose, and makes it of a pleasant consistency for use. The oil of peppermint in combination with the iodoform is far reaching and lasting in its action.

ALUMINIUM PLATES.—In swaging a dental plate of aluminium it is of the first importance to keep the plate from contact with either the zinc die or the lead counter, and for that purpose use the thinnest and best silk tissue-paper obtainable. Anneal the plate often by merely burning off a coat of oil. Place the tissue-paper on both sides of the plate, and keep a close watch on the paper in order to the immediate substitution of fresh paper for the sheet or sheets that may have become broken during the swaging.

THE USE OF SOFT FOIL.—Soft foil cannot, says Dr. Guilford, be used except in simple cavities having good walls. Strictly cohesive foil is objectionable because of its nonadaptability. We get the good qualities of each in semi-cohesive foil. It has the adaptability of non-cohesive foil, and sufficient cohesive qualities may be obtained by heating it. If strictly non-cohesive foil is used to line cavities, it is apt to be displaced—whereas semi-cohesive foil will remain where you put it.

IMAGINATION ; OR, THE CORKSCREW.—Do you wish to extract bad roots painlessly? Being aware that the key is unpopular and the forceps in favour, I have never met a dental advocate of the corkscrew. A middle-aged woman requested me to remove three deep and painful roots from highly inflamed gums. I extracted the two easier with the forceps, when, leaping from the chair, the patient relieved her mind thus : “ I *caan’t* an’ I *shaant* ! I might’s well go ’ome’n die as ter die *ere*’. I a’n’t slep’ fer *three weeks*, ’n I’m erbout *onsoddered*.” “ I am going to remove that root, so that you’ll go home happy and sleep.” “ Wall, yer *caan’t* wi’ them pinchers. *Caan’t* yer pull it wi’ a corkscrew ? ” “ O ! yes, easily.” Then, dropping the forceps down my coat sleeve, I *feigned* to adjust the corkscrew to the root, which I extracted with the forceps without a sign of pain. The forceps again entered my sleeve, and, when turning from the spittoon, she saw me calmly viewing the root on the corkscrew, the halo of happiness on that woman’s face ought to have been contagious, as she exclaimed : “ Yer couldn’t ’ave got it wi’ the pinchers, *could* ye ? It never hurt me *one mite*.” MORAL : That woman evidently regarded the corkscrew as an instrument designed to give pleasure—an instrument dear to her soul, and the last she saw ere leaving home. Verily, the ways of men (and women) are astonishing, We owe this to *Items of Interest*, it is from the pen of Dr. W. E. Gorham.

Abstracts of British & Foreign Journals.

WESTERN DENTAL JOURNAL.

REFLEX NEURALGIA DEPENDENT UPON DENTAL IRRITATION.

BY A. D. FRIEDRICH, M.D., D.D.S.

NEURALGIA merely means nerve pain. It is the symptom indicative of a lesion at some point and that the pain is due to some morbid condition or to some irritation of a nerve. Dental irritation gives rise to neuralgia of the face, of the eyes, ears, stomach, neck, shoulder, and it would really seem that there is occasionally and in some individuals a special and exceptional communication between the fifth nerve and those of the arm. Cases are cited taken principally from Dr. Garretson's System of Oral Surgery.

"CASE I. A patient, a young lady, who sought advice for neuralgia of the face and of the ear and scalp. She described her agony as being sometimes so great that only from chloroform could she get even a temporary relief; she had been taking tonics and opiates throughout the summer; she had no pain in any of her teeth, although in the upper jaw was a pulpless molar. Examining her mouth the attention was attracted to a peculiar overriding of the second bicuspid tooth of the lower jaw by the first molar. The employment of a delicately curved probe revealed caries of the first of these teeth, exposing the pulp. The tooth was extracted, and the distant and apparently disassociated neuralgia instantly disappeared."

"CASE II. Neuralgia of neck and arm from carious molar. H.S., at the age of seventeen acute symptoms had ceased for two or three years, leaving but a grumbling uneasiness in the tooth. At this time neuralgic pains began to extend from the tooth down into the neck and left side, and thence over the collar-bone down the left arm, these pains lasting several days and then remitting. There was no actual pain in the tooth itself nor any tenderness in it nor in the adjacent gum, nor any appearance of inflammation. The situation of the pain in the neck and clavicular and supra-maxillary

regions was exactly that of the cutaneous branches of the cervical plexus, and the part of the arm where the aching was most intense and intolerable was at the insertion of the deltoid. These symptoms disappeared with the extraction of the lower anterior molar, and have never since returned."

"CASE III. Intense neuralgia of the eye-ball and face; alteration of the colour of the iris; carious tooth. Mrs. C., aged 30, had suffered for ten years from severe neuralgia affecting the left eye-ball and left side of the head and face, the iris of the affected eye having changed from a deep and bright hazel to a dull gray. The left lower dens sapientiae and the first upper bicuspid being found badly carious, these were extracted, and the operation was attended by a terrible paroxysm of neuralgia, but after this had subsided the patient experienced relief for about three months, when the old pain returning, the second upper bicuspid was found to be carious and intensely tender, and upon its removal a considerable exostosis was found on the root. The pain vanished with the root." (Guy's Hospital Reports.)

"CASE IV. Chronic trismus from impaction of lower dens sapientiae in a man aged 23, with large teeth and comparatively small maxillary bones; the lower wisdom teeth were embedded and unable, from want of room, to come into place. The result was recurrent pain and swelling within the mouth, followed by a sudden attack of lockjaw, apparently caused by contraction of the left masseter muscle, which, after four months' duration, was cured by extraction of the left second molar, the wisdom tooth being out of reach. The posterior fang of the extracted tooth was much eroded by absorption."

"CASE V. Intense and general neuralgia from exostosis on fangs of teeth. Miss B. P. had gone through her first dentition without trouble, but on account of some crowding on the permanent teeth, an upper and lower bicuspid on either side were extracted to make room. During adolescence she was attacked by neuralgic pains, at first confined to the branches of the trigeminus, but afterwards extending to the arms, legs, etc., indeed, nearly the whole body. The teeth, though apparently sound, had a tendency to elongate and spread, especially the upper incisors, with which the pain was at first associated. The offending teeth always gave pain on being slightly struck. Mr. Bell removed, from time to time, the teeth most obviously connected with the neuralgia, in each case with temporary relief of the suffering, and in

every case the fangs of the extracted teeth were found encrusted with nodular exostosis, though the teeth themselves were free from caries. When Mr. Salter saw Miss P. (in 1851), only the two lower left bicuspid remained, and these were causing a continuance of the neuralgia, which ceased after their removal. On the fangs of both these teeth were the expected nodules of exostosis. This patient is stated to have been remarkably anæmic, the gums being like wax stained of the palest pink, and the alveoli remaining white and bloodless for some seconds after extraction before blood enough oozed from the broken vessels to partially fill the hollow sockets.

CASE VI.—Wry-neck from carious teeth of lower jaw. A young woman whose head had for more than six months been drawn down nearly to the left shoulder with considerable pain, was relieved in a few days by the removal of a stump and a partially decayed tooth from the left side of the lower jaw.

CASE VII. Neuralgia of face, neck and arm, with partial paralysis of the latter from carious wisdom tooth. Miss W. was suffering from constant aching pains in the left side of the face and neck and in the left arm. The pain sometimes became intensely severe. The arms had lost nearly all muscular power. These symptoms, after resisting all medical treatment for two years, disappeared in a few hours after the removal of the tooth.

CASE VIII. Neuralgia of the stomach from a carious lateral incisor. A young man, 27 years old, who had suffered at intervals from an intense gastralgia for six months previous to being seen during which period he had resorted to various physicians for relief, and from his narration had run the gauntlet of usual medication, which was sufficiently evidenced by his physical condition. In a conversation he recited the facts of his sufferings and his despair of obtaining relief from them, as the paroxysms seemed latterly to have become more frequent. It was suggested that probably his teeth might be the real seat of the trouble. He doubted this, however, as they had never given him any pain, and none of the physicians whom he had consulted ever hinted that the teeth might probably be the cause. An inspection of the mouth revealed a badly decayed upper lateral incisor, with exposure of the dental pulp, which pulp was at once removed, then the tooth was treated and filled. This gentleman was under observation

subsequently for six months, without a single recurrence of his disease.

CASE IX. Facial neuralgia from crowded denture, preventing eruption of an upper canine. Reported by Dr. John W. Adams, at the March, (1887), meeting of the New Orleans Odontological Society. A lady patient, after suffering intense facial neuralgia for several months, presented herself to him for relief. There was considerable crowding of the upper denture, which was relieved by the extraction of one of the upper lateral teeth, thus allowing space for the canine to erupt. The neuralgia, in due time, disappeared, to the inexpressible delight of the lady, who had been led to regard her case as incurable.

In cases of this character and in others where no tooth pain whatever is present, the mode of ascertaining the real situation of the cause of the disturbance is as follows : First provide yourself with a mouth mirror, so as to be able to see all the surfaces of the teeth, and then with a sharp-pointed dental probe, explore all the cavities and surfaces around and about the teeth, until you strike the offending member, of which the patient will very probably inform you by the vigorous manner his nervous system will resent the contact. Failing in this, observe if there be any discoloured tooth in the arch, that is, a tooth more opaque than its fellows, which indicates that its pulp has died or been destroyed. These teeth are frequently the seat of periosteal inflammation and reflex trouble. By rapping on them, they will be found to be more sensitive than their neighbours and will thus betray their presence. Of course, there are other appearances and conditions, acquaintance with which is acquired by experience, which influence the opinion of the specialist ; but, at all events, a tooth should not be removed without reasonable grounds for so doing. It will be observed that there are various diseases of the teeth from which neuralgia may arise, among which may be enumerated chronic inflammation of the dental pulp, difficult eruption of the wisdom teeth, crowding of the denture, secondary dentine in the pulp cavity, decomposition of a dead pulp, in a confined space, exostosis, alveolar periostitis, filling upon an exposed pulp, exposure of sensitive dentine, roughening of the fang by absorption, &c., the most common being chronic inflammation of the pulp ; conditions all of which are liable to intrude themselves at any time during the life-time of the teeth, often occasioning distressing consequences, which sometimes result fatally.

ROOT-FILLING *versus* NERVE-CAPPING.

By Dr. G. W. REMBERT, Natchez, Miss.

THE writer's experience confirmed the opinion that root-filling as a practice is far more certain, and attended with better results, than nerve-capping. In the 15 years of his practice he had read everything published about nerve-capping, and had experimented,—nerve-capping is but an experiment always,—employing all possible care and skill; and commonly rarely exceeding four years from the time of the operation, he had a dead tooth as the reward for his labours. The successful cases, almost without exception, were those in which he adopted the following procedure: Combine into a thin paste with either wood creasote or carbotic acid powdered oxide of zinc, and spread lightly over the entire surface covering the exposed pulp, being careful that no pressure is made upon the pulp at the point of exposure. Next mix a thin paste of oxyphosphate of zinc, or what is better, agate cement, which is spread gently over the surface of the first, still avoiding pressure upon the pulp. Usually the entire cavity is filled with the preparation, which, after hardening, is excavated and filled as any ordinary cavity. By this method success will be secured where success is attainable, but a larger proportion of even these cases are failures than where devitalization and root-filling are practised, more especially in pathological exposures. Simple traumatic exposure—in excavating—when there has been no previous pain, and in a cavity favourable in form and situation, can be capped with every assurance of success.* But the writer believes that the capping of exposed, inflamed, congested, and partially suppurating dental pulps is largely unsuccessful. In these cases he would devitalize and extirpate the pulp and fill the root. In these last he would not include *nearly* exposed pulps having only a thin covering of softened dentine, but which have never given evidence of pathological disturbance other than slight temporary sensitiveness under specially irritant action. These anyone can cover and feel pretty certain of no after-trouble. His method of filling roots is, devitalize the pulp with arsenic, commonly using the devitalizing nerve-fibre made by the S. S. White Dental Co. Notwithstanding the objections against arsenious acid, he has, after 15 years' use

of it, only just enough fear of it to make him careful in its use. He believes that damage from its use in devitalizing pulps is the result of ignorance or carelessness. Sometimes in hyperæmic pulps arsenic seems powerless to destroy vitality. In such cases he depletes with an ordinary excavator, and after the hæmorrhage has subsided, applies carbolic acid (full strength) freely, afterwards inclosing some of the acid in the cavity with a filling of gutta-percha or agate cement. In three or four days the pulp can, as a rule, be removed painlessly. Sometimes the portion of the nerve in the root is highly sensitive and unamenable to devitalization by any drugs he has ever tried. In such cases he caps the vitalized portion. After destroying the pulp and removing the débris, the cavity is enlarged with chisel and engine-burs until the entrance to each canal is brought into good view. Plenty of room is necessary. The direction and length of the canal are next determined with an explorer. The canal is then enlarged with flexible drills and burs, beginning with the smallest, as near to the foramen as possible. This can only be done, of course, where the roots are nearly or quite straight. When the root is so curved as to risk drilling through the side, he discontinues the work, taking the chances of its aching. Though he has drilled through the side a few times, he believes little harm is done, provided the operator does not fill through the side opening. For filling roots he prefers gold foil No. 4; next to this tin foil or a paste of oxide of zinc and eugenol, which latter he deems especially valuable where there is abscess and the apex has been absorbed and the foramen is large. The gold foil is cut into strips of one-fourth sheet each, rolled on a three-sided broach into cylinders of greater length but less diameter than the canal. These are carried to the end of the canal with a small root-plugger, first being dipped into carbolic acid as an antiseptic precaution. After filling two-thirds or three-fourths of the root, he usually fills the remainder, including the pulp chamber, with agate cement.

To rotate a tooth, Dr. R. B. Adair has a platinum band, to which is soldered a little cylinder; one end of a coil of very fine piano-wire is placed in the cylinder; the other is flattened and passed between the teeth. Almost any tooth can be thus rotated in two or three days with very little soreness or annoyance.

Reports of Societies.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

The Ordinary Monthly Meeting of the above Society was held November 4th, 1889, Mr. Henry Sewill, M.R.C.S., L.D.S., President, in the chair.

The minutes of the preceding meeting having been read and confirmed, Mr. Henry George Read, having signed the Obligation Book, was formally admitted to membership by the President.

Mr. F. Denison Pedley, F.R.C.S., Edin., M.R.C.S., L.D.S., of 17, Railway Approach, London Bridge, was balloted for and elected a Member of the Society.

The Curator (Mr. Storer Bennett) announced the following additions to the Society's collection :—He desired, firstly, to draw attention to the specimens upon the table. One of these was the skull of a young male Singapore unicorn rhinoceros, which was of especial interest from its showing the transition from its milk to its permanent dentition. He remarked that Professor Owen had pointed out that a correlation existed between the incisors and the horns in these creatures. Cuvier and others had shown that in a fossil specimen of an extinct form, in which no horn was present, six incisors existed in the upper and lower jaws. Mr. Bennett reminded the members that in the unicorn rhinoceros only four incisors were found, whilst in the two-horned rhinoceros they were altogether absent, and since probably a chief use of these structures was for defence and offence, it would look as if developmentally the horn represented the absent incisors. He also showed models sent by Mr. Cormack, of Elgin, of the mouth of a man—Peter Laing—aged 105 years, who possessed five teeth in his lower jaw, but none in his upper. He was in excellent health and came of a long-lived family, his father having lived to the age of 109, and his grandfather was said to have died at 135. Mr. Bennett further stated that he had received for the Society a number of models representing regulation cases, but, as he had only just received them, he proposed with the permission of the Society, to defer to a later meeting any detailed account. Dr. Talbot, of Chicago, had kindly presented the models.

The President called upon Mr. England to explain his method of opening the antrum.

Mr. England said : The patient, having been put under the influence of nitrous oxide gas the opening should be made in the region of the first permanent upper molar. If it is necessary to remove a tooth the operator should select for enlargement and perforation through the posterior buccal root in preference to the palatine, as from the direction of the latter there is danger of either opening into the floor of the nose if the antral chamber be small, or, if the opening should be successfully made the slanting position it necessitates for the tube, renders the adjustment of the plate difficult to the patient. When no tooth is present the opening should be made in the middle line of the alveolar ridge at right angles to it. For the purpose of making the opening he used a spear-headed drill, in conjunction with the dental engine, of about one-eighth of an inch in diameter and of such a length that while allowing a considerable thickness of tissue to be penetrated before entering the antrum, there is no danger of perforating the floor of the orbit, the nozzle of the hand-piece acting as a stop. The opening is then enlarged with a trocar of a size sufficient to ensure the passage of a tube of at least one-eighth of an inch in diameter ; this trocar is fitted with a movable collar, which acts as a stop and prevents it perforating further than desired. A model is then taken in the usual way and a plate made with the tube reaching well into the antrum ; the mouth of the tube should be fitted with a screw, so that it can be opened or closed at will.

Mr. W. E. Harding (Shrewsbury) brought before the Society a specimen of dermoid cyst containing hair and teeth. A swelling had existed in the patient's abdomen for about eighteen months, which was diagnosed as a case of ovarian cyst. Mr. Harris, of Shrewsbury, Mr. Harding's colleague, cut down upon the tumour and removed it. Upon puncturing the cyst it was found to have solid contents containing six teeth, a tress of hair and a detached ball of hair, as well as extremely thick pus, which solidified to the consistence of beef dripping. Mr. Harding had made a cast of the cyst, which he presented to the Society. The cyst itself, he regretted to say, he had been unable to obtain, as it was required for a local collection. With regard to the origin of these dermoid cysts, he believed it was generally accepted that they arose from an induplication of the epiblastic layer during early

intra-uterine life. This becoming entangled in that portion of the foetal structures which afterwards developed into the ovary, grew true dermal structures—namely, teeth and hair.

The President remarked he did not recollect any similar case having been brought before the Society. These cysts were very interesting, and although not common were not rare.

Mr. Storer Bennett asked if any Member could offer information concerning the structure of teeth contained in dermoid cysts. He was not aware of any book which gave accurate description of them, and it would be interesting to ascertain whether they were composed of dentine or what. He thought that if a section of one of the teeth could be obtained and reported upon, it would enhance the value of the communication.

Mr. Hern pointed out that one of the teeth had dropped out of its position in the specimen, and from careful examination it seemed to him to be without a root, looking indeed as if the root had become absorbed.

Mr. George Cunningham (Cambridge) had seen a most remarkable case of dermoid cyst in Buda-Pesth, the full particulars of which he hoped to lay before the Society at a later occasion. He would only mention that the cyst appeared to contain both temporary and permanent teeth, and some of the teeth appeared to be carious.

Mr. Hunt (of Yeovil) said that perhaps all the members were not aware of the interesting specimen at present in the collection of the College of Surgeons, which had been placed there by the celebrated Surgeon Highmore, who formerly resided in his neighbourhood. The specimen was one of an encysted foetus which had been removed from the abdominal cavity of a young man—the point of interest was to decide the question how it got there.

Mr. Harding, in replying, stated, that all the teeth appeared very loosely connected with the cyst, as if they were held by ligamentous rather than bony attachment. The teeth of the patient were perfectly normal both in number and structure.

The President then called upon Dr. Felix Semon to read his paper. [See page 1085.]

Subsequently a discussion upon the paper was taken.

STUDENTS' SOCIETY, NATIONAL DENTAL HOSPITAL.

THE last Ordinary Meeting of this Society was held on Friday, Nov. 1st., at 8.0 p.m.

Sidney Spokes, Esq., (President), in the Chair.

The minutes of the previous Meeting were read by the Secretary, and confirmed.

Mr. Thomas Read and Mr. Chas. B. S. Buist were present as visitors, and received the usual form of welcome from the President.

The following gentlemen were elected members of the Society, viz.,—Messrs. Andrew, Hempstead, and Smith.

Mr. Allnutt was appointed Hon. Secretary by the Council.

Casual Communications.—Mr. H. Read showed a case of Impacted Wisdom Tooth, also a case of Necrosis in the lower jaw, from a child, æt. 6 years.

Mr. T. G. Read showed an upper molar tooth, having only two roots, together with the corresponding lower tooth from the same mouth, which might be said to have only one root.

Dr. F. Wright showed some specimens of crown work.

The President then called upon Mr. Read, for his Paper entitled "Some Historic Points, and Practical Hints on Crowning."

At the conclusion of the Paper a discussion followed in which Messrs. Read, Clarke, Dr. Wright, the Dean and the President took part. Mr. Read having replied to these gentlemen, a hearty vote of thanks was accorded him for his instructive, and interesting Paper.

The Meeting was then adjourned until Friday, Dec. 6th.

CHAS. P. ALLNUTT, *Hon. Sec.*

Dental News.

THE DENTAL HOSPITAL OF LONDON.

THE Annual Dinner of the staff and past and present Students of the Dental Hospital of London, and London School of Dental Surgery was held in the Venetian Chamber at the Holborn Restaurant, on Saturday evening, November 30th. Mr. Christopher Heath, F.R.C.S., presided, and was supported

amongst others, by Dr. Julius Pollock, Mr. Pearce Gould, Dr. Dudley Buxton, Dr. Stack, Dr. Walker, Mr. Morton Smale, Mr. James Smith Turner, Mr. Woodhouse Braine and Mr. Henry Morris.

The Chairman in proposing the health of the past and present Students, recommended his hearers to remain always Students or they would find themselves behind the progress of the day.

Mr. J. R. Brownlie, of Glasgow, and Mr. A. W. Hoffman replied.

Mr. J. S. Turner gave the toast of the Dental Hospital of London and Staff. He mentioned that there appeared on the record 13,000 cases of extraction for the last year. There were also nearly 10,000 cases of extraction under nitrous oxide gas, and it was greatly to the credit of the gentlemen who administered that gas that they rendered their services to the Hospital without remuneration. The Hospital was tolerably well supported by the public, but very well supported by the Medical and Dental professions. He was glad that the College of Surgeons were making increased demands on Dental Students, as he thought it would add to their efficiency as professional men.

Mr. R. H. Woodhouse responded.

Mr. Morton Smale in acknowledging toast of "The London School of Dental Surgery," said, that he considered education the only cure for the chicanery and quackery in the profession, that the authorities looked to those duly educated in our schools to bring about a high code of professional ethics. He alluded to the claims of American dentistry, and said that dentistry like the kindred sciences of Medicine and Surgery was common to the civilized world, and therefore that there was no special dentistry called American dentistry, and that the quacks now used these terms, and had gone as far as buying a bogus diploma from America for a few pounds. While he agreed with Mr. Turner as to the good likely to accrue to the Dentists from the increased curriculum, he hoped yet to see the day when all dental students, like all medical students, would not only have the same curriculum, but would also have to pass the 1st and 2nd professional examinations for the conjoint diploma.

From the report and statements made it appeared that the usefulness of the Institution became more marked every year. The total number of operations performed in 1888 was 51,406,

being 3,965 in excess of those of the previous year, and 29,402 in excess of the number treated in 1874, when the Hospital was removed to its present site in Leicester Square, that chiefly owing to legacies received during the last year the mortgage debt on the Hospital, incurred through its indispensable enlargement had been reduced by £2500, but that there was still a deficit of £3000 to be paid off, for which the Committee were now appealing, as well as for funds for the maintenance of the Hospital.

A selection of vocal and instrumental music was performed during the evening by the members of the Musical Society of the Hospital.

STUDENTS' SOCIETY. DENTAL HOSPITAL OF LONDON.

AN interesting event took place at the Dental Hospital of London, at the close of the Students' Society meeting on December 9th, when Mr. Wm. Hern, the President was presented with a handsome silver salver and an illuminated book containing the signatures of the donors.

Mr. Robert Woodhouse took the chair. After expressing the pleasure it was to him to officiate, he explained that those present and many others desired to make the occurrence of Mr. Hern's wedding during his second year of office the occasion for showing how much they valued the services he had rendered the Society and Hospital.

Mr. Porter in a few eloquent words then begged Mr. Hern's acceptance of the gift, saying, "We hope it may serve from time to time to recall to your memory the days, when you were our President, and may stand as a mark of our appreciation of the energies you devoted and the time you gave up for our good and for our benefit, both as teacher and President."

After many words of thanks from Mr. Hern, and a hearty vote of thanks to the chairman, the meeting separated.

I N D E X.

	PAGE
Abscess, Dental. By W. H. Dolamore	141
Abstracts of Foreign Journals—	
Relation of the Teeth and Palate to Vocalism	35
Supplementary to Report of the Committee of Dental Materia Medica	76
Fœtor or Foul Breath	113
Arsenious Acid	114
Investigations upon Decay of Teeth	168
Tempering Instruments	218
Economy in the Dental Office	257
Electricity and Sulphur in Dentistry	259
Unusual Effect of a full Subcutaneous dose of Cocaine	260
Suppuration of the Antrum	262
Filling Teeth with Exposed Pulp	298
Clasps	300
Continuous Gum Dentures	353
Amalgam Fillings	354
What is the best method of Filling Canals?	354
Alveolar Abscess, Treatment of, by Excision of Roots... ..	396
Prosthetic Dentistry... ..	397
Inter-Dental spaces, excessive, caused by Voluntary Tooth Movement	435
Deciduous Teeth filled with Oxy-Phosphate	437
Careful Finishing of Amalgam Fillings	498
Neurectomy of Fifth Nerve	676
Calcific Inflammation	493
Pyorrhœa Alveolaris	500
Advantages of Cotton	
Root Canal Filling	532
Bleaching Teeth	535
Crowns, When and Where should be used	540
Mistakes	548

	PAGE
Tumours of the Periodontal Membrane... ..	441
Antipyretics, Antineuralgics	515
On Outbreak of Syphilis after Tattooing	590
Use of Cocaine	591
Washing Amalgam	583
Pregnancy in Dental Operations	594
Sensitiveness of Dentine explained by Fluid contents	644
Facial Neuralgia	646
Destroying and Removing Pulp	685
Continuous Gum Work	684
Crown and Bridge Work	732
Soft Rubber Palates for Congenital Clefts	777
Gold	779
A Quarter-century of Operative Dentistry	781
Campho-Phenique	783
Discussion of Dr. Ingersoll's paper	784
Sensitive Dentine	788
Hints for the Laboratory	805
Retaining plugs used in Regulating	879
Soft Foil, and Progressive Dentistry	882
Dental Irregularities of the Native Races	882
Survival of the Unfit in Human Dentition	884
Gum Coloured Porcelain Fillings	885
Copper Amalgam	888
The use of a Mouth Mirror... ..	891
Chloride of Methyl	930
Electricity, and its uses in Dentistry	934
Thoroughness	976
Necrosis of Superior Maxillary and Palatal Bones... ..	979
Answers to Queries	1011

	PAGE		PAGE
Common Sense Dentistry ...	1012	Atkinson, L.D.S., J. Ottley—	
The Chemical Bleaching of		Notes on Nitrous Oxide ...	749
Teeth	1015		797, 951
Reflex Neurosis in relation to		BARNES, Charles. Sixth Year	
Dental Pathology...	1019	Molars	519
Another Vulcanizer explodes	1059	Bate, Spence, Death of, ...	725
The Face	1059	Obituary of	738
Some Methods of Regulating		Between Two Evils. By Dr. Low	1082
Teeth	1063	Briault, W., on Dental Edu-	
Reflex Neuralgia	1111	cation	1048
Root-filling v. Root-capping	1115	Bridge-Work. By A. Retter,	
Abbott, L.D.S.I., Joseph, The		D.D.S.	510
Pathology of Actino Mycosis	911	— Removable, By. E.	
Abrasion and Erosion. By C.		A. Connell	606
H. Robinson	1025	— — By J. H. Gar-	
Abscess, Dental	141	trell	746
Actino Mycosis, Pathology of		Brighton Dental Hospital ...	134
By J. Abbott	911	Buxton Dudley Wilmot, M.D.,	
Address, Inaugural, before the		B.S., London. When is Ni-	
Odontological Society. By		trous Oxide a dangerous	
H. Sewill	239, 286	Anæsthetic? I, 47, 158, 198,	282
Address, Inaugural, by William		— An Additional Note	
Headridge	941	on Nitrous Oxide	845
Address, Presidential. By S.		— An Address on Anæ-	
Lee Rymer	758	thetics	963
Advantages of a few methods of		— Anæsthetics—their uses	
Gold Filling	372	and administration (Review)	306
Advertising	553		
Alveolaris, Treatment of Pyor-		Campbell, Dr. S. G. Case of	
rhea and similar Tissue		Old Standing Fixation of	
Alteration	995	the Jaw	859
Amalgams. By St. Geo. Elliott	52	Campion, G. C., L.D.S. Some	
— Use of... ..	273	points of Practical Impor-	
— Fallacies. By Thos.		tance in the use of Amalgam	273
Fletcher	44	Caries and Necrosis—in their	
— Fillings and Sore Mouth	428	relation to practical dentis-	
Anæsthetics in Dental Surgery	868	try. By J. A. Martindale	862
— General. By J. P. Oliver	954		917
— An Address on. By		Cavities, Preparation of, for fill-	
Dr. Dudley Buxton	963	ing Cohesive Gold, By J.	
— Deaths under... ..	970	F. Colyer	989
Anchylosis of Jaw	365, 369	Cheoplastic Work. By J. Ren-	
Antisepticism in Dental Sur-		shaw	202
gery. By R. H. Woodhouse	419	Closure of the Jaw from Ankylo-	
Antrum, Electric Light as a		sis. By Frederick Page	305
means of diagnosis in Em-		Cocaine, Dangers of	110, 642
pyema of the Antrum. By		— Death from	347
Dr. Herynx	893	— Personal experience of	23
Antrum of Highmore, The Diag-		— Poisoning Chronic	249
nosis and Treatment of Dis-		— Habit, The	525
eases of. By Dr. Moritz		— Use of, for the Alleviation	
Schmitz.	194	of Pain. By E. Haughton	187
Empyema of, Some Points in		Cohen, Isaac. Facial Neuralgia	322
the Etiology, Diagnosis and		College of Surgeons, New Regu-	
Treatment of. By Dr. Semon	1085	lations for Dental Curricu-	
Artificial Teeth, Improved		lum	1074
way of Inserting. By			
Dr. Parr	903		

	PAGE
Colyer, J. Frank, L.R.C.P., Lond., M.R.C.S. & L.D.S., A case of Closure of Jaw of 43 years standing ...	800
„ Notes on the Perforation of Cavities for Cohesive Gold Filling ...	989
Copper Amalgam. By G. M. Emens ...	488
Correspondence. 44, 92, 138, 182, 315, 363, 364, 460, 553, 604, 700, 746, 795, 807, 892, 938, 940, 988	
Council, E. A., L.D.S., Eng., Removable Bridgework ..	605
Crowning, Some Historic points and Practical Hints on ...	1041
Crowns, On the adaptation of Gold and Richmond. By M. Woolf ...	229
Crowning, Using English Teeth, Some methods of. By T. G. Read ...	183, 555, 604
Crown, Attaching artificial tip to broken. By Mr. Skeet...	24
Cummings, J. E.—What Fillings shall we use? ...	660
Cunningham, George, B.A., D.M.D., L.D.S.— Implantation of Teeth 5, 63, 100, 152, 205, 246, 1096	
International Dental Congress	467
DAVIS, E. B., Some Results from the use of Iodoform ...	574
Dental Act, 1887, Victoria ...	697
Dental Chemistry. By F. D. Nellie, D.D.S. ...	485
Dental Congress, International	467
Dental Curriculum, New Regu- lations ...	1077
Dental Education at Harvard. By T. G. Read ...	380
—By E. C. Fisk ...	111, 163, 638, 1048
—By Mr. Briault ...	1048
Dental News 43, 89, 134, 181, 182, 226, 270, 314, 358, 411, 455, 507, 552, 603, 695, 738, 792, 986, 1033, 1077, 1120	
Dental Surgery at Guy's Hos- pital ...	60
Dental Quackery and false per- sonation ...	30

	PAGE
Dolamore, W. H. Dental Ab- scess ...	141
Doctor or Mr.—Which? ...	44
EDITORIAL 26, 69, 107, 163, 212, 250, 292, 343, 392, 428, 490, 525, 577, 637, 674, 723, 765, 801, 868, 927, 970, 1006, 1055, 1105	
Edinburgh, Dental Hospital, Opening of ...	457
Education, Dental 111, 163, 629, 1041	
Elliott, Dr. L. L. George. On Amalgams ...	52
Electrical Progress and Dental Progress. By A. Kirby ...	561
Electric Light in Diagnosis of Empyema of Antrum. By Theodore Heryng ...	893
Embedded Dentures in the Lower Jaw ...	382
Emens, G. F. Copper Amal- gam ...	488
Enamel, Pits and Fissures ...	996
Epithelioma Springing from the socket of a Tooth. By C. S. Tomes, F.R.S....	509
Echarotics and Coagulants. By Dr. A. W. Harlan ...	852
Everts, C. C., on Filling an Ar- tificial Tooth ...	994
Exeter Dental Hospital ...	562
Ethics Professional ...	557
Existence of Teeth without Roots ...	399
Facial Neuralgia. By J. Cohen	322
Ferrier, David. On some rela- tions of the Fifth Cranial Nerve ...	653, 701
Filling, Cohesive Gold, Prepara- tion of Cavities for ...	987
— Combination of metals for. By N. Wilson, D.D.S.	
Fisk, E. C. Dental Education	629
Fletcher, Thomas, F.C.S. On Amalgam Fallacies ...	44
— On White Fillings ...	363
— On Moisture proof Gutta Percha fillings ...	988
Fracture of Lower Jaw. Four cases of. By Newland Pedley ...	317
— of Jaw and their Treat- ment By F. A. Harsant	14

	PAGE		PAGE
GLASGOW Dental Hospital ...	297	International Dental Congress	467, 792
Gold Fillings. By W. Whittaker ...	372	Iodized Paper ...	524
Gutta Percha Filling Moisture proof. By Thos. Fletcher	988	Iodoform ...	514
Guy's Hospital. Dental Surgery at. By Rowland Pedley.	60	Ireland, Dental Hospital of ...	226
— Hospital. Dental school Scheme ...	69, 527	JAW, Case of Old Standing Fixation of ...	859
HÆMORRHAGE after Tooth extraction ...	110	KIRBY, A., L.D.S., Electrical Progress and Dental Practice ...	561
Harsant, F.A., L.D.S. Fractures of the Jaws and Treatment ...	14	LARYNX, Foreign Bodies in ...	665
Harlan, Dr. A. W. Escharotics and Coagulants ...	852	Legal Intelligence	270, 358, 454, 695
Harrison, H. H., Why do fillings fail? ...	754	Literary Notices and Selections	80, 116, 171, 218, 301, 400, 1025
Headridge, William, L.D.S.I. Inaugural Address...	941	Liverpool Dental Hospital ...	136
Hepburn, David L.D.S., Remarks on Section Plates ...	557	Louis, James, Obturators ...	521
Heryng, Theodore. The Electric Light as a Means of Diagnosis in Empyema of the Antrum ...	893	Low. Dr., Between two Evils	1082
Hern, W., Notes of a Case of Scleritis ...	915	MALFORMATION of Teeth, a Surgeon's Notes on	413, 461
Hospital Reports	45, 93, 183, 228, 364, 507, 555, 652, 747, 807, 940, 988, 1083	Manchester Odontological Society	124, 222, 407, 648, 1066
Houghton, Edwin, L.D.S., The Use of Cocaine for Alleviation of Pain ...	187	Manipulative Miscellany—	
Hutchinson, Jonathan, F.R.S., LL.D., A Surgeon's Notes on Certain Diseases and Malformations of the Teeth	413, 461	Ball-bearing Office Lathe ...	34
Humphreys, John, Suppression and Specification of Teeth	80, 116, 171, 218, 301	Absorbent Dental Napkins...	74
Hydronaphthol ...	217	Absorbent Cotton do. ...	74
IMPACTION of Foreign Bodies in the Larynx ...	665	Darby's Capsicum Plasters ...	75
Implantation of Teeth, see—Teeth, Implantation of ...		Young's Patent Adjustable Perforators...	75
Ingersoll, D.D.S., The Relations of the Tooth-pulp to the other Tooth tissues	708	Hydro-Napthol ...	217
		Gas Apparatus, New ...	351
		Shoulder Bur for Shaping Roots ...	352
		Mr. Leman's Improved Section Valve ...	729
		Martindale, J. H., Caries and Necrosis in their relation to Practical Dentistry ...	862, 917
		Maxilla, Inferior, Fracture of	317
		Meriam, Horatio C., Professional Atmosphere and Morals on Patents and Secrets v. a Liberal Profession	570, 607

	PAGE		PAGE
Metal Cap Crowns, Some Sug- gestions of. By W. Mit- chell	95	PAGE, F.R.C.S., Fredk. Closure of the Jaws from Ankylosis of Tempero-Maxillary Joint	365
Metals, Combination of, for filling Teeth	849	Parr, H. A. Improved Method of Inserting Artificial Teeth	902
Mexican Dental Patients ...	906	Pedley, F. Newland. Dental Surgery at Guy's Hospital	60
Micro-organisms of the Mouth. By G. W. Watson	619	— Four Cases of Fractured Maxilla. Treatment. ...	317
Missouri Dental College ...	458	Pharyngeal Tumours. On some congenital. By J. Bland Sutton	56
Mitchell, William, D.D.S., Some Suggestions on Metal Cap Crowns	95	Phthisical Hæmoptysis or Hæma- temesis. What caused death	190
		Pitts and Tissues in Dentine. By R. R. Andrews, D.D.S.	996
NEEPER, H. R., On a Case of Replantation	210	Presidential Address	758
Nellie, F. D., M.D.S. Syracuse, New York—Dental Chemis- try	485	Professional Atmosphere and Morals, v a Liberal Profes- sion... ..	570, 607
Nerve, Fifth Cranial, some rela- tions of	653, 701	Professional Charges	138
Neuralgia, Facial. By J. Cohen	322	Prosecution under Dental Act see Legal Intelligence ...	
Nitrous Oxide, When is it a dan- gerous Anæsthetic? By D. W. Buxton, M.D. 1, 47, 158, 198, 282		Pulp Tooth. Relation of the the other Issues. By D. Ingersoll, D.D.S.	708
Nitrous Oxide, Queries on. By Appleby King	892	Pulp. Study of the Chemical Composition of the Dental. By W. H. Whitstar ...	1037
— Fatality under	924	Pyorrhœa Alveolaris, Treatment of. By C. B. Atkinson ...	996
— Extraction of Teeth under	938		
Notes on Nitrous Oxide. By J. Ottley Atkinson 749, 797, 951		QUACKERY Dental 30, 130, 140 — Suppression of	92
Obturators. By James Louis	521		
Odontological Society 43, 87, 89, 118, 182, 263, 438, 504, 543, 595, 687, 1117		READ THOS. G. Some methods of Crowning thin English Teeth	183
Odonto-Chirurgical Society of Scotland	265	— Dental Education at Harvard	380
Oliver, J. P., General Anæsthe- tics	954	— Stanley Mr. Syphitis; history and the Manner in which it affects the mouth	475
Oxide, Nitrous, Administration An additional note on. By Dudley Buxton	845	REFLECTIONS FROM THE SUR- GERY	
— Fatal Case under	924	Operation of attaching Artifi- cial Tips to Broken Crown of an Incision	24
Oxygen as an adjunct to Nitrous Oxide in Dental Work ...	472	Replantation	210
		Malignant Disease of the An- trum	252

	PAGE		PAGE
Remarkable Case of Thumb Sucking	972	Skeet, Attaching Artificial Tip to broken Creose ...	24
Case of Closure of Jaws of 43 years standing	800	Smith, A. H., On Malignant Disease of Antrum ...	522
Notes of a Fatal case of Nitrous Oxide Anæsthesia ...	942	Students Society, National Dental Hospital 530, 694, 1032, 1120	
Accidental Removal of a First Bicuspid	061	Student's Society, Victoria Dental Hospital	651
Remarks on Suction Plates air, Chambers Dr.	557	Student's Society, Dental Hospital of London 40, 177, 267, 357, 503, 982, 1072, 1122	
Removable Bridge work ...	605	Suppression and Specialization of Teeth, J. Humphreys, 80, 116, 171, 218, 391	
Renshaw, L.D.S.I., Cheoplastic Work	202	Suction Plates, Air Chambers and Artificial	558
Reports of Societies 40, 87, 118, 124, 177, 222, 263, 365, 267, 269, 310, 313, 357, 407, 438, 442, 449, 502, 543, 546, 550, 551, 595, 948, 687, 981, 1032, 1066		Sutton J. Bland, F.R.C.S. — On Some Pharyngeal Tumours	56
Retter, D.D.S., N.Y., A Bridge Work	510	— On the Relation of Rickets to some Forms of Odontomes	425
Results from the of Iodoform... ..	514	Supplement, Dental Students. I. The Licensing Corporations. Comparative Summary of Regulations for License in Dental Surgery ...	809
Registration, Frandulent ...	344	II. Preliminary Examinations. Regulations of the Medical Council. 1. Universities of the United Kingdom	813
Reviews		Other Bodies named in Schedule (A) to the Medical Act	815
Anæsthetics, their use and Administration. By Dr. Dudley Buxton... ..	306	3. Examining Bodies in United Kingdom not included in Schedule (A) to Medical Act, 1858 ...	816
Test Book of Operative Dentistry. By Dr. Thomas Fillebrowne	355	4. Certain Examination of Indian, Colonial and Foreign Universities and Colleges	816
Rickets in Relation to some forms of Odontomes. By J. Bland Sutton	425	Regulation of Dental Students	817
Rogers, Geo. What caused the Death?	196	III. Educational Bodies. Dental Hospital of London, and London School of Surgery	818
Rymer, S. Lee, Presidential Address	758	National Dental Hospital and College	820
SCHMIDT, Dr. Moiretz, The Diagnosis and Treatment of Diseases of the Antrum of Highmore	194	Guy's Hospital	822
Sclerotitis, Notes of a Case of. By John Hern, M.D. ...	915	Edinburgh Dental Hospital and Schools	823
Semon, Dr. Felix, On Empyema of the Antrum	1085	Glasgow Dental Hospital and Schools	823
Seventeenth Congress of German Surgical Society of Berlin ...	359		
Sewill, Henry, M.R.C.S., L.D.S., Inaugural Address before the Odontological Society of Great Britain ...	239		
Silk, J. Fred. W., M.D., The Value of Oxygen as an adjunct to Nitrous Oxide in Dental Work	472		
Anæsthetics at the British Dental Association	795		
Sixth year Molars. By C. Barnes, D.D.S.	519		

	PAGE
Birmingham School of Dentistry, Queen's College	825
Birmingham Dental Hospital	826
Dental Hospital of Ireland	826
The Owen's College, Manchester	827
Victoria Dental Hospital of Manchester	828
Liverpool Dental Hospital	829
Plymouth Dental Hospital	829
Exeter Dental Hospital ...	830
Dental Tuition	831
Private School of Anatomy, Physiology and Surgery	831
IV. General Hospitals	
Charing Cross Hospital ...	832
London Hospital Medical College	832
Kings College, Strand W.C.	833
Middlesex Hospital ...	833
St. George's —	833
St. Bartholomews Hospital and College	834
St. Mary's Hospital Medical School	834
St. Thomas's Hospital ...	834
Westminster —	835
School of Medicine, Edinburgh	835
Harvard University, Dental Department, Boston, Mass. U.S.A.	835
The Dental College of the University of Michigan	836
V. Scientific Associations	
Odontological Society of Great Britain	837
Odonto-Chirurgical Society of Scotland	839
The British Dental Association, Benevolent Fund of the British Dental Association	841
British Dental Association, Western Branch	842
The Midland Branch of the British Dental Association	842
British Dental Association Eastern Counties Branch	843
Students Society of the Dental Hospital London ...	843
Students Society of the National Dental Hospital and College	84

	PAGE
Teeth, Implantation of. By G. Cunningham. 5, 63, 100, 152, 205, 246, 1096	
— Improved Method of inserting Artificial ...	902
— Without Roots. By Professor Rose ...	390
— Malformation of. By Jonathan Hutchinson, F.R.S. 413, 461	
Tomes, F.R.S. A Case of Epithelioma springing from the Socket of a Tooth ...	509
Tooth, Some Hints on Filling an Artificial ...	994
Unprofessional Conduct ...	182
Viagero—Mexican Dental Patients ...	906
Victoria Dental Hospital ...	89
Watson, Geo. W., L.D.S., Ed. The Micro-organisms of the Mouth and their association with disease ...	619
What Filling shall we use? ...	660
What caused Death? By G. Rogers ...	190
Wheeling, Dr. H. Harrison.—Why do Fillings fail? ...	754
White Fillings. By Mr. Whitehouse ...	242
— on Th. Fletcher ...	363
Whittaker, Geo. O.—Advantages of a few Methods of Gold Filling ...	372
Whitehouse, Mr. On White Fillings ...	422
Why do Fillings Fail?... ...	754
Williams, H. Lloyd on Thumb Sucking ...	672
Wilson, W. N. The Combination of Metals for filling Teeth ...	849
Woodhouse, R. H. On Antisepticism in Dental Surgery... ...	419
Woolf, M. On the Adaptation of Gold and Richmond Crowns ...	229



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